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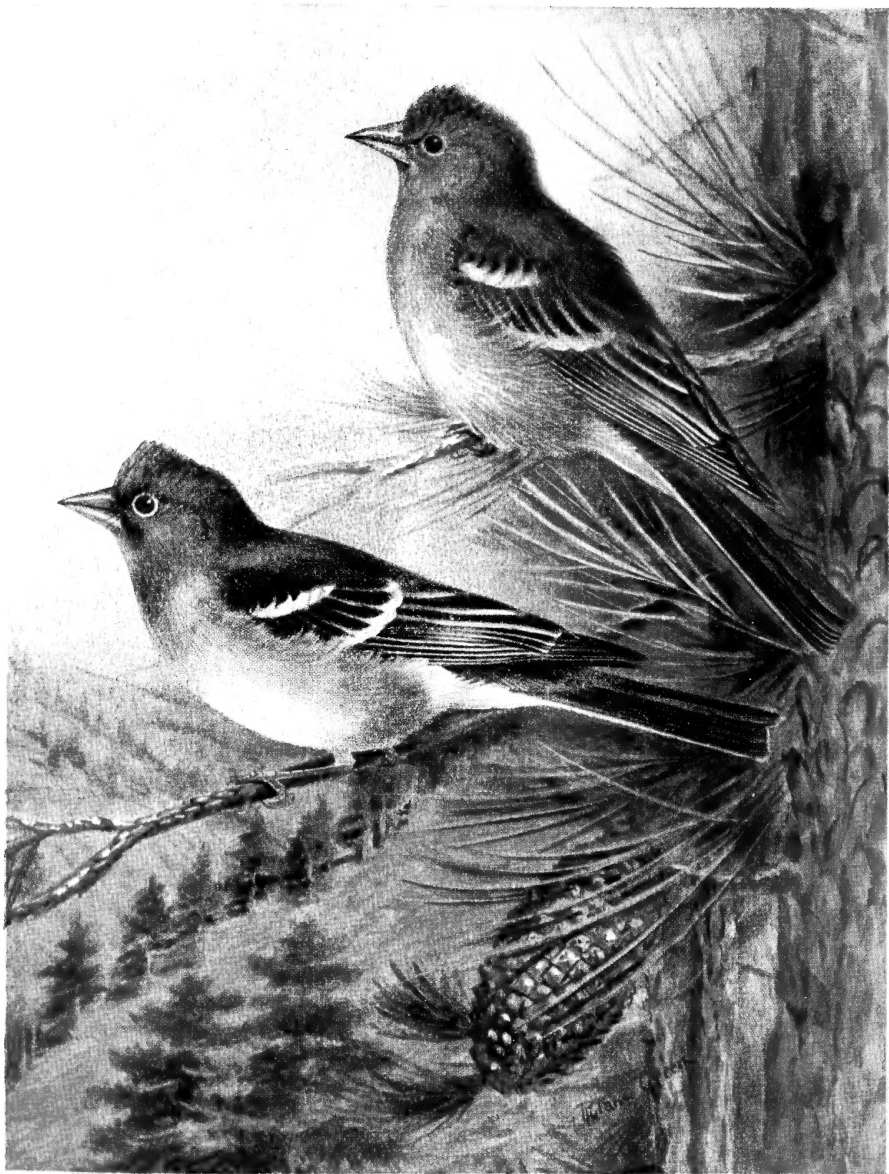
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THE CANARY ISLANDS

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The Blue Chaffinch of Gran Canaria.

THE CANARY ISLANDS

THEIR HISTORY, NATURAL HISTORY
AND SCENERY

AN ACCOUNT OF AN ORNITHOLOGIST'S
CAMPING TRIPS IN THE ARCHIPELAGO

BY

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WITH ILLUSTRATIONS AND MAPS

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TO
MY WIFE

FOREWORD

THIS book does not profess to be a complete Natural History of the Canary Islands. It deals principally with their Ornithology, and Parts II. and III. contain accounts of various expeditions made by the author during a more or less thorough exploration of the group on behalf of the Bird Department of the British Museum of Natural History. When in pursuit of birds in the various islands, it naturally followed that other subjects besides ornithology had, in the course of investigations, to be studied. The geological formation of the Islands had to be examined in relation to the fauna and flora; the Zones of Vegetation for their bearing on the distribution of bird-life, and so it came about that the material for Chapters II. to VI. was accumulated. The ornithological results have already been published in the pages of the *Ibis*—the Journal of the British Ornithologists' Union. The lack of any really brief account of the discovery and conquest of the Islands prompted me to include Chapter I., although it is somewhat outside the scope of this book. So attractive is the early history of the Archipelago, that any traveller sufficiently interested in the Natural History of the Islands to read these pages, will almost certainly want to know something of their early inhabitants and conquerors.

An attempt has been made to give the author's impressions of the varied physical characteristics of the Islands and to convey to the reader some impression of the scenes visited during ten different visits to the Archipelago. In Appendix B will be found a complete list of the Birds of the Islands—Residents, Migrants and Casual Visitors, their status and the islands in which they occur.

To Mr W. R. Ogilvie-Grant, until recently Assistant-Keeper of Zoology, British Museum (Natural History), and to the late Mr C. E. Fagan, C.B.E., I.S.O., Secretary of the Natural History Museum, the author owes more than he can express for the support, both official and unofficial, which they gave to his ornithological exploration of the Canary Islands. The author has much pleasure in acknowledging his deep debt of gratitude to Mr Campbell Smith, M.C., of the Department of Minerals, British Museum, for the great assistance he has given him when writing Chapter II.; for examining and reporting upon all rock specimens which were obtained, and finally for his valuable "Note on a Fall of Dust, 'Blood-rain,' at Gran Canaria in 1920" which appears in full as Appendix A. Mr J. L. Bonhote has been good enough to read through the proof-sheets of Chapter VI., and his valuable advice on many points has been greatly appreciated. The acknowledgments of the writer are also due to the Editor of the *Ibis* for allowing him to reproduce the coloured illustrations of Chaffinches and Titmice, and also the maps which, with the exception of that of Graciosa, were specially drawn by Mr H. Milne.

Others to whom thanks are gratefully tendered are Dr Prior, F.R.S., and Dr Rendell, F.R.S., of the British Museum (Natural History), and Dr Eagle Clarke, I.S.O., F.R.S.E., until this year Director of the Royal Scottish Museum, Edinburgh; for their help and advice: to the late Colonel H. W. Feilden, C.B., for valuable criticism and suggestions and to numerous friends and residents in the Canary Islands, amongst whom special mention should be made of Mr T. Morris, H.B.M.'s Consul-General in the Canary Islands, Major Swanston, H.B.M.'s Consul in Las Palmas, and the firm of Messrs Elder & Fyffe, all of whom have contributed in no small measure to the success of the various expeditions.

The photographs which appear in this volume were all taken by the author, with the exception of Fig. 2, p. 48, Fig. 2, p. 88, Figs. 1 and 2, p. 158, and Fig. 1, p. 162 (Mrs E. M. Bannerman); the illustration facing p. 200 (Mrs Herbert Hope); Figs. 1 and 2, p. 164, and Fig. 1 opposite p. 264 (Mr H. Bishop), the negatives of which have been kindly lent by the owners whose names are mentioned.

To my publishers, I should like to express my indebtedness for the great consideration they have shown me, and for the care which they have bestowed on the reproduction of the Plates and Maps.

D. A. B.

THE BIRD-ROOM,
BRITISH MUSEUM (NATURAL HISTORY),
LONDON, *October 1921.*

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PART I

DISCOVERY, CONQUEST, AND EARLY HISTORY

CHAPTER I

A BRIEF SKETCH OF THE DISCOVERY, CONQUEST, AND EARLY HISTORY OF THE CANARY ISLANDS, AND THEIR INHABITANTS.

IT is to the poets that we must turn for the earliest mention of the Archipelago, which is the subject of this book. It has been suggested, with some cause, that the Canaries were known to the Phœnician colony of Carthaginians at Cadiz three thousand years ago, and Homer alludes to the "habitations of the blest," which it is generally inferred were the "Fortunate Islands"—the name by which the Canaries are often known.

Plutarch, in his life of Sertorius, refers to two of the Canary Islands about 82 B.C. in the following passage: "He (Sertorius) there (in Andalucia) found some mariners lately arrived from the Atlantic Islands. These are two in number, separated from each other by a narrow channel, and lying at the distance of four hundred leagues from the African coast. They are called 'The Fortunate Islands.' Rain seldom falls there, and then falls moderately; while they have usually soft breezes which scatter such rich dews that the soil is not only good for sowing and planting, but spontaneously produces the most excellent fruits; and those in such abundance that the inhabitants have only to indulge themselves in the enjoyment of ease and leisure. The air is always pleasant and salubrious, through the happy temperature of the seasons, and

their insensible transition into each other. For the north and the east winds, which blow from our continent, are dissipated and lost in the immense interval: and the sea winds (that is, the south and the west) bring with them from the ocean slight and gentle showers, but still more frequently only a refreshing moisture, which imperceptibly scatters plenty over their plains. Hence it is generally believed, even among the barbarians, that these are the Elysian Fields and the seats of the blessed, which Homer has described in all the charms of verse."

The two islands here alluded to are probably Fuerteventura and Lanzarote. Pliny next alludes to the islands, mentioning five of them by name from a memorandum preserved by a certain Statius Sebosus "from the accounts of navigators of his time" in the year 53 B.C. The islands mentioned by name are: 1. Junonia; 2. Pluviālia; 3. Capraria; 4. Convallis; 5. Planaria.

Pliny is again the historian who chronicles the expedition sent by King Juba the Second of Mauretania to explore the Fortunate Islands. On the return of this expedition King Juba drew up a report of the islands which Pliny has handed down to us as follows:—

"The Fortunate Islands lie to the south-west, at 625 miles from the Purpurariæ. To reach them from the latter they first sailed 250 miles westwards and then 375 miles to the east. The first is called Ombrios, and contains no traces of buildings. There is in it a pool in the midst of mountains, and trees like ferrules, from which water may be pressed, which is bitter from the black kinds, but from the lighter ones pleasant to drink [sugar-cane]. The second is called Junonia, and contains a small temple built entirely of stone. Near it is another smaller island having the same name. Then comes Capraria, which is full of large lizards. Within

sight of these islands is Nivaria, so called from the snow and fogs with which it is constantly covered. Not far from Nivaria is Canaria, so called on account of the great number of large dogs therein, two of which were brought to King Juba. There were traces of buildings in this island. All the islands abound in apples and in birds of every kind, and in palms covered with dates, and in the pine nut. There is also plenty of honey. The papyrus grows there, and the *Silurus* fish is found in the rivers."

In this account it is more possible to distinguish which islands are meant. Nivaria is of course Tenerife, Canaria is Gran Canaria. Ombrios, Junonia, and Capraria are undoubtedly Palma, Gomera, and Hierro, but opinions differ as to whether Ombrios is best identified with Palma—the "pool in the midst of mountains" inclines one to the belief that the Caldera of Palma is here alluded to—or rather with Hierro. It will be noted in the following pages that two birds, native of, and peculiar to, Hierro, have been sub-specifically named *ombriosa*¹ by their discoverers.

Thence for many centuries the history of the Canary Archipelago lies buried in oblivion. In 1334 we learn that the Archipelago was, by his own request, bestowed upon Luis de la Cerda, Count of Talmond, by the Pope; but Don Luis does not seem to have profited by Pope Clement VI.'s permission to become Lord of the Islands, or, as he was then termed, the Prince of Fortune. Seven years later, in 1341, a voyage was made to the Canaries under the auspices of the King of Portugal: the narrative of this expedition is given at length in the introduction to *The Canarian*, edited

¹ Canon Tristram was of opinion that Hierro was best identified with Ombrios. His researches were invariably carried out with great accuracy, and should therefore carry weight.

by Mr Major of the British Museum. Therein we are told that it is to the poet Boccaccio we are indebted for the history of the King of Portugal's expedition. The information was derived from letters written by certain Florentine merchants of Seville, and is of such interest that I include it as recorded in the Hakluyt Society's volume where the following account appears :—

“On the 1st of July of that same year, two vessels, furnished by the King of Portugal with all the necessary provisions, and accompanied by a smaller vessel, well armed and manned by Florentines, Genoese, Castilians, and other Spaniards, among whom were naturally included Portuguese—for the word “Hispani” included all inhabitants of the Peninsula—set sail for [from] Lisbon, and put out into the open sea. They took with them horses, arms, and warlike engines for storming towns and castles, in search of those islands commonly called the ‘Rediscovered.’ The wind was favourable, and on the 5th day they found land. They did not return till the month of November, when they brought back with them four of the natives, a large quantity of goats’ skins, the fat and oil of fish, and seal skins; red wood which dyed almost as well as the verzino (Brazil wood), although connoisseurs pronounced it not to be the same; the barks of trees to stain with a red colour; red earth and other such things. Nicoloso de Recco, a Genoese, the pilot of this expedition, stated that this Archipelago was nearly 900 miles from the city of Seville; but that reckoning from what now is called Cape St Vincent, the islands were much nearer to the continent, and that the first of those which they discovered (most probably Fuerteventura) was 150 miles in circumference; it was one mass of uncultivated, stony land, but full of goats and other beasts, and inhabited by naked men and

women, who were like savages in their appearance and demeanour. He added that he and his companions obtained in this island the greater part of their cargo of skins and fat, but they did not dare to penetrate far into the country. Passing thence into another island (Great Canary), somewhat larger than the first, a great number of natives of both sexes, all nearly naked, came down to the shore to meet them. Some of them, who seemed superior to the rest, were covered with goats' skins, coloured yellow and red, and, as far as could be seen from a distance, the skins were fine and soft, and tolerably well sewn together with the intestines of animals. To judge from their gestures they seemed to have a prince, to whom they showed much respect and obedience. The islanders showed a wish to communicate with the people in the ship, but when the boats drew near the shore, the sailors, who did not understand a word that they said, did not dare to land. Their language, however, was soft, and their pronunciation rapid and animated, like Italian. Some of the islanders then swam to the boats and four of them were taken on board and afterwards carried away. On the northern coasts of the island, which were much better cultivated than the southern, there were a great number of little houses, fig-trees and other trees, palm-trees which bore no fruit, and gardens with cabbages and other vegetables. Here twenty-five of the sailors landed, and found nearly thirty men quite naked, who took to flight when they saw their arms. The buildings were made with much skill, of square stones, covered with large and handsome pieces of wood. Finding several of them closed, the sailors broke open the doors with stones, which enraged the fugitives, who filled the air with their cries. The houses were found to contain nothing beyond some excellent dried

figs, preserved in palm baskets, like those made at Cesena, corn of a much finer quality than the Italian, not only in the length and thickness of its grain but its extreme whiteness, some barley, and other grains. The houses were all very handsome and covered with very fine wood, and as clean inside as if they had been whitewashed. The sailors also came upon a chapel or temple, in which there were no pictures or ornament, but only a stone statue representing a man with a ball in his hand. This idol, otherwise naked, wore an apron of palm-leaves. They took it away and carried it to Lisbon. The island seemed to be thickly populated and well cultivated; producing, not only corn and other grain, but fruits, principally figs. The natives either ate the grain like birds, or else made it into flour, and ate it with water without kneading. On leaving this island they saw several others, at the distance of five, ten, twenty or forty miles, and made for a third, in which they remarked nothing but an immense number of beautiful trees shooting straight up to the skies (most probably Ferro, remarkable for its magnificent pines). Thence to another, which abounded in streams of excellent water and wood (Gomera). They found also many wild pigeons, which they killed with sticks and stones. They were larger and of better flavour than those in Italy. Falcons and birds of prey were numerous. The sailors ventured but a very little way into the country. At length they discovered another island, the rocky mountains of which were of immense height and almost always covered with clouds, but what they could see during the clear weather seemed very agreeable, and it appeared to be inhabited (Palma). They afterwards saw other islands, making in all thirteen, some of them inhabited and some not, and the farther they went the more they saw. They

remarked the smoothness of the sea which separates these islands, and found good anchorage, although there were but few harbours, but all the islands were well provided with water. Of the thirteen islands five were inhabited, but some were much more populous than others. The languages of these people were said to be so different that those of one island did not understand those of another, and they had no means of communication except by swimming. A phenomenon which they witnessed on one of these islands (Tenerife) deterred them from landing. On the summit of a mountain, which they reckoned to be more than thirty thousand feet high, they observed what from its whiteness looked like a fortress. It was, however, nothing but a sharp point of rock, on the top of which was a mast, as large as a ship's mast, with a yard and a lateen sail set upon it. The sail when blown out by the wind took the form of a shield, and soon afterwards it would seem to be lowered, together with the mast, as if on board a vessel, then again it was raised and again would sink, and so alternately.

"They sailed round the island, but on all sides they saw the same phenomenon, and thinking it the effect of some enchantment, they did not dare to land. They saw many other things also, which Nicoloso refused to relate. At any rate the islands do not seem to have been very rich, for the sailors hardly covered the expense of the voyage.

"The four men whom they carried away were young and beardless, and had handsome faces. They wore nothing but a sort of apron made of cord, from which they hung a number of palm or reed fibres of a hair's breadth and a half or two hairs' breadth, which formed an effectual covering. They were uncircumcised. Their long light hair veiled their bodies down to the

waist, and they went barefooted. The island whence they were taken was called Canary, and was more populous than the others. These men were spoken to in several languages, but they understood none of them. They did not exceed their captors in stature, but they were robust of limb, courageous, and very intelligent. When spoken to by signs they replied in the same manner, like mutes. There were marks of deference shown from one to another ; but one of them appeared more honoured than the rest. The apron of this chief was of palm-leaves, while the others wore reeds, painted in yellow and red. They sang very sweetly, and danced almost as well as Frenchmen. They were gay and merry, and much more civilised than many Spaniards. When they were brought on board, they ate some bread and figs, and seemed to like the bread, though they had never tasted it before. They absolutely refused wine, and only drank water. Wheat and barley they ate in plenty, as well as cheese and meat, which was abundant in the islands and of good quality, for although there were no oxen, camels, or asses, there were plenty of goats, sheep, and wild hogs. They were shown some gold and silver money, but they were quite ignorant of the use of it ; and they knew as little of any kind of spice. Rings of gold and vases of carved work, swords, and sabres were shown to them ; but they seemed never to have seen such things, and did not know how to use them. They showed remarkable faithfulness and honesty, for if one of them received anything good to eat, before tasting it he divided it into portions which he shared with the rest. Marriage was observed among them, and the married women wore aprons like the men, but the maidens went quite naked, without consciousness of shame."

In 1382 Gran Canaria was visited by one Francisco Lopez, who had sailed from Seville and took refuge from a tempest "at the mouth of the Guineguada." This man with his twelve companions lived peacefully on the island for seven years, but all were eventually murdered by the inhabitants, who had heretofore treated the castaways kindly.

During the thirteenth century the Canaries were visited by numerous adventurers and navigators in search of plunder and personal gain, but none attempted seriously the conquest of the Archipelago. It was not until 1442 that what is known as the French Conquest of the Canary Islands took place. The chief of this expedition has hitherto been supposed to be Jean de Bethencourt, Lord of Granville la Teinturière, in the Pais de Caux in Normandy, the account of whose conquest of certain of the islands was drawn up by the two chaplains of the expedition, Brother Pierre Boutier (spelt "Bontier" in this MS.), a monk, and Jean le Verrier. This was carefully translated from the Mont Ruffet manuscript of 1482 by Mr Major for the Hakluyt Society, and was published by that society in 1872. Boutier and le Verrier were the official historians of this expedition—le Verrier the spiritual attendant of Bethencourt, Boutier of Gadifer de la Salle.

I shall revert to Major's translation, which contains a masterly introduction, and to the story set forth by the priest and the monk later; the date when this translation appeared (1872) is important, and it may here be remarked that the volume in question has been considered the standard work on the Canaries for all scholars of the nineteenth century. Since this publication appeared, however, Professor Beazley has drawn attention in the *Geographical Journal* to a much earlier

manuscript, now in the British Museum, known as the Egerton manuscript, to which Major had not access. From this manuscript it seems clear that the honours of the expedition to the Canaries belong rather to Gadifer de la Salle, who accompanied Bethencourt, than to the latter, as has hitherto been generally inferred. Instead of Bethencourt being the leader, it is obviously Gadifer to whom the chief credit was due, but in other respects the narratives are much the same.

Gadifer and Bethencourt, with their retinues, set out from La Rochelle on the 1st of May 1402 with a view to conquering the Canary Islands, calling at Vivero, Corunna, and Cadiz *en route*. At length, after eight days, they arrived at Graciosa—a small island which is only inhabited at the present day during part of the year by fishermen and their families, and which was probably quite uninhabited in the days of which we are writing. Gadifer was the first to land in Lanzarote—the large island separated from Graciosa by a narrow strait—and at length he and Bethencourt, by arrangement with the natives who had come down to meet them, held a council with the king of Lanzarote. The result of this meeting seems to have been that the native king submitted to the explorers without more ado, and for a time friendly relations existed between them, which were only upset eventually by the treachery of one of Gadifer's and Bethencourt's subordinates. A castle was then built by the newcomers on the coast at a place named Rubicon, and was used as the headquarters of the expedition, where stores and arms were kept.

At the suggestion of Gadifer an expedition was then taken to the island of Fuerteventura by the two leaders, but Bethencourt was soon compelled to return to Lanzarote, leaving Gadifer and his company to

continue alone. In the meantime, the natives of Fuerteventura had retired to the south of the island, and Gadifer, being unable to get into touch with them, returned with his men to Lobos—a tiny island lying between Fuerteventura and Lanzarote. Owing to the refusal of the master of his ship to carry out his commands, Gadifer was himself compelled to return to Lanzarote, where he again joined Bethencourt at Rubicon. Disaffection amongst the seamen caused Bethencourt at this point to return to Spain in order that he might obtain fresh men, arms, and provisions, so that the conquest of the other islands might be completed. During Bethencourt's absence on this quest at the Court of Henry III., King of Castille, Gadifer had returned to Lobos in search of seals (which are still found there at the present day) and was then the victim of the treachery of one Berthin de Berneval, who during his absence pillaged the castle of Rubicon, stole the stores, captured the king of Lanzarote (who however succeeded in escaping), and having won over the master of a Spanish ship which had put in to Lanzarote, set sail for Spain, carrying with him a number of the Canarians as captives. Gadifer, left on Lobos, was in complete ignorance of what was taking place in Lanzarote, and eventually became in great distress from hunger and thirst, as Lobos is a barren islet without even a single spring. At length he was rescued by a Spaniard whose ship was lying in Graciosa, and who with four men from Rubicon who had remained faithful to Gadifer, crossed in a little cockboat to Lobos. On their arrival, Gadifer was greatly astonished to hear of the treachery of Berthin, whom he had trusted and placed in command during his absence from Lanzarote.

Meanwhile Bethencourt had been well received at the Court of Castille, and the King of Spain, having

accepted Bethencourt's homage, had granted to him the Lordship of the Canaries—of which, it is said, the King had never even heard. When Gadifer received the news that Bethencourt had not supported his own claims at the Spanish Court he was greatly distressed, and this was the first seed of dissension sown between the two leaders of the expedition. Gadifer felt that Bethencourt had not taken proper measures for his relief when hearing of the straits he was in, and further he accused him of posing as "Lord of the Canaries" and of turning everything to his own account.

After De Berneval's treachery, the natives of Lanzarote became hostile to Gadifer and to those who remained with him, and the mariners found their life on the island increasingly difficult. The vessel which had brought news of Bethencourt was then used by Gadifer for sailing to the other islands.

Fuerteventura was visited first, and the explorers set out for the River Vïen de Palmes in search of the natives; a certain valley which they encountered was described by the historians as "lovely and unbroken and very pleasant: it was shaded by about eight hundred palm-trees . . . with streams running between them." In this island only four women were captured and taken back to the boat. From Fuerteventura they proceeded to Gran Canaria, entering a large harbour between Feldes (Telde) and Argonnez (? Aguïmes), and here they conversed and traded with the natives but did not land. It was whilst in this anchorage that Gadifer received news of the murder of the thirteen Christians, of whom mention has already been made.

Leaving Gran Canaria, they coasted along Hierro, but did not land there, proceeding to Gomera, where they arrived at night-time and found the natives making fires on the shore. Some of the crew thereupon landed

and captured a man and three women, whom they brought back to the ship, but on landing next morning to take in water they were attacked by the assembled natives and forced to return to their ships.

They next attempted to make for Palma, but a great storm arose and they were driven to Hierro, where they landed and remained twenty-two days, taking captive four women and a child. "They found great numbers of pigs, goats, and sheep, though the country is very barren all round for a league from the shore ; but in the centre of the island, which is very high, the country is fertile and pleasant, and full of large groves, which are green in all seasons ; it contains more than a hundred thousand pine-trees, most of which are so thick that two men can hardly make their arms meet round them ; the water is good and plentiful, for it often rains in these parts ; and quails abound in astonishing quantities."

From Hierro the navigators sailed to Palma, "where they anchored to the right of a river which fell into the sea, and having supplied themselves with water for their return again set sail," shaping their course for Rubicon in Lanzarote. Here they discovered that their companions had during their absence taken many native prisoners, and the remainder were coming from day to day to throw themselves upon their mercy.

Shortly after Gadifer's return from his voyage to the other islands, Bethencourt himself arrived from Spain, soon afterwards going to Fuerteventura, where he remained some time, and thoroughly explored the country. It was about this time that the two leaders quarrelled, Gadifer severely reproaching Bethencourt with his conduct towards him. At this point, however, Gadifer proceeded to Gran Canaria with a number of companions, and having been driven out of his course, anchored eventually off Telde, from whence he sailed

down the coast to Argygneguy (? Arguineguin), where a fight took place between his crew and the islanders, which ended in the rout of Gadifer's men. This took place soon after the 25th of June 1404.

After his return to Erbania (Fuerteventura), Gadifer and Bethencourt renewed their dispute, which ended in both sailing for Spain, but in different ships. On their arrival in Spain the King was informed of the quarrel, and Gadifer de la Salle, seeing that Bethencourt had more influence at Court than he could ever hope to obtain, accordingly left Spain and returned to France.

Bethencourt was then solemnly proclaimed "Lord of the Islands" and returned to the Canaries, later sailing to France to obtain the necessities for forming a colony. These he obtained, and once again set out for the Islands, bringing with him his nephew, Maciot de Bethencourt. In October 1405 he made another unsuccessful attempt on the island of Gran Canaria, but succeeded in forming colonies in Palma and Hierro. Finally, in 1406, he left the Islands under the Governorship of Maciot, and returning once more to France, died at Grainville in 1425. Many years afterwards a memorial was placed to Jean de Bethencourt, "Roi des Canaries," in the Grainville Church, where his body lies buried.

The regency of De Bethencourt's nephew was anything but successful. Maciot seems to have had very little of his uncle's aptitude for government, and soon commenced to make his tyranny felt. Having ceded the Islands, of which he was only regent, to Pedro Barba de Campos, who had been sent to intervene by Queen Catherine of Castille, he actually resold them to Prince Henry of Portugal, subsequently selling them again to the Count de Niebla, each of these in turn selling them to others! At the death of Jean de

Bethencourt, the Islands were bequeathed by the rightful owner to Reynard de Bethencourt, Jean's brother. But still Gran Canaria, Tenerife, and Palma were unconquered.

In 1443 a successful raid under the direction of Prince Henry the Navigator was made on Palma, and from this date onwards the Canaries passed through many hands. A dispute then arose between the Spanish and the Portuguese as to their claims on the Islands. This was not finally settled until 1479, when a treaty was signed between Alfonso V. of Portugal and Ferdinand and Isabella of Castille, declaring the Canaries to belong to Spain.

We have still to treat of the conquest of the three largest islands of the Western Group—Gran Canaria, Tenerife, and Palma—the inhabitants of which had hitherto withstood all attempts to bring them under subjection.

Another circumstantial account of the history of the Canary Islands, written by Juan de Abreu de Galindo, a Franciscan friar who lived in Palma, is handed down to us by the Englishman, George Glas, who published Galindo's manuscript in 1764.

Galindo, having given an account of Jean de Bethencourt's exploits and of the unsatisfactory disposal of the Islands by Maciot, names the various claimants to the Lordship of the Islands immediately succeeding Maciot's departure. The chief of these seems to have been one Diego de Herrera of Seville, who inherited the Islands by marrying Ignes Paraza, the daughter of Guillen Paraza, who had himself received them as a gift from the Count de Niebla. Herrera, by virtue of his marriage, became Lord of the Canary Islands in 1444, and immediately settled in Lanzarote with his wife, Donna Ignes. From the time of their

arrival in the Eastern Islands, it seems to have been their chief desire to reduce the islanders of Gran Canaria and to claim this unconquered island as their own. In this they were like their predecessors—unsuccessful. Complaints having been made of their conduct in the Islands, they were summoned to Seville to answer the charges brought against them. In consequence of this the King and Queen of Spain—Ferdinand and Isabella—agreed to pay Herrera a large sum of money in return for his abandonment of his claims to Gran Canaria, Palma, and Tenerife; and although they were at the time engaged in a war with Portugal, fitted out an expedition under Don Juan Rejon, which set sail on the 23rd of May 1477, anchoring just a month later off the Isleta. The troops, on landing, set out for Gando, but finally camped where the town of Las Palmas now stands. While there the Spaniards were attacked by a number of Portuguese, who put into Agaëte with the intention of assisting the islanders; but owing to the heavy seas, they were prevented from landing all their men, and finally, having lost most of their boats, drew away from the island and sailed home.

An attack was afterwards made on the Canarians at Moya, they being under the leadership of a chief named Doramas, but from this little success resulted. As usual, dissensions arose amongst the Spaniards themselves, and probably owing to this cause the Spaniards were severely defeated by the islanders at Tirajana and compelled to re-embark in their ships at Guiniguada, from whence they returned to Spain.

On the return to Canaria of Juan Rejon, who had avenged himself on his enemies, plans were made for a raid on Tamaraceite, but before this could be carried out, on the 18th of August 1480 a ship arrived from

Spain carrying Pedro de Vera. This man had been sent by Ferdinand and Isabella to supersede Rejon, and when he had taken over the command of the Spanish forces Rejon was unjustly returned to Spain as a prisoner. Here he vindicated his character, and having given a good account of his stewardship in Gran Canaria, was given command of the forces which were soon to be despatched against Tenerife and Palma.

In the meantime Pedro de Vera had slain, single-handed, the Canarian chief, Doramas, and soon held all the plains—the Canarians having retreated to the Cumbres, where they held all the passes. An attack was made by the Spaniards in the neighbourhood of Tirajana; and later, the Canarians, under the leadership of Ventagoya, made a night attack on the invaders at Las Palmas, where a fierce battle ensued.

Pedro de Vera kept harrying the natives at such widely separated spots as Galdar and Fataga, but at length his men suffered a severe defeat at Ajodar, the Canarians catching them in a narrow *barranco* and rolling big stones down upon them. It is surprising to learn that after this victory the Canarians, who were now all gathered together at Ansite, voluntarily surrendered to Pedro de Vera on the 29th of April 1483. Pedro then became Governor of the island under Ferdinand and Isabella of Spain, but, according to Glas, Gran Canaria was not incorporated into the Crown of Castille until the 20th of February 1487.

At this time Diego de Herrera was still Lord of Lanzarote, Fuerteventura, Gomera, and Hierro, but he died on the 22nd of June 1485. It has already been noted that Juan Rejon had been entrusted with the conquest of Palma and Tenerife, but this unfortunate man, on his way to Palma, was driven ashore on

Gomera, where he was killed in a scuffle with Hernando Peraza, the son of Diego de Herrera, who had inherited the island from his father.

The conquest of Palma was then undertaken by Alonzo de Lugo, who had been one of Pedro de Vera's lieutenants in Gran Canaria. Having raised the necessary money and fleet, he sailed for the Canaries and landed at Tazacorta in Palma on the 29th of September 1490. The conquest of part of the island was made easy by reason of the natives on the south-west being already on good terms with the Spaniards in Hierro; and Alonzo de Lugo wisely won over these islanders by making them presents instead of by force of arms.

The natives of the north-eastern part refused to be pacified so easily, and they were attacked by the Spaniards, who took a number of prisoners, and on seeing that the invaders treated their captives well, the remaining natives no longer opposed the Spaniards in their progress. The only natives remaining hostile had taken up their position in the Caldera, and these were finally vanquished and the island won for the Spanish Crown on the 3rd of May 1491. Alonzo de Lugo captured the Palman chief, Tanause, and sent him to Spain, but there, however, he starved himself to death.

From Palma the conquerors next proceeded to Tenerife, where, according to Galindo, they landed at Santa Cruz on the 3rd of May 1493. Friendly relations were soon established between Alonzo de Lugo and the kings of Guimar, Anaga, Adeje, and Abona—four of the districts into which the island was divided for the purpose of administration. The powerful king of Taora, however, scornfully rejected the proposal made to him by Alonzo that he should become a vassal of the

King of Spain, and the Spaniards thereupon passed over the plain of Laguna, past Tacoronte to Orotava, where they seized many flocks belonging to king Taoro's subjects. The Guanches closely pursued the marauders and fell upon them at Centejo, in a narrow pass, almost annihilating the entire force; whereupon Alonzo de Lugo repaired to Gran Canaria in order to collect fresh troops, leaving the few who had survived the slaughter of Centejo in the tower which he had built at Santa Cruz.

Alonzo de Lugo soon collected a large force from Spain and from those islands which had already been conquered, and anchored off Santa Cruz for the second time, on the 2nd of November 1494. The Guanches had by this time gathered in great force and a skirmish took place near Laguna, after which the Spaniards continued their march against their former conquerors. We are told by Friar Juan de Abreu de Galindo, whose manuscript, written in 1632, was published by Glas, that the subjugation of the inhabitants of Tenerife by the Spaniards came very shortly after the skirmish at Laguna mentioned above; for the Guanches saw that the Spaniards were in considerable force, and therefore made an agreement with them without further bloodshed, consenting to become Christians and to become vassals of the King of Spain. Alonzo de Lugo was thereupon invested with the Governorship of this island and laid the foundations of St Christobal de la Laguna on the 25th day of July 1495.

There is, however, another account of the conquest of Tenerife which is possibly more accurate than that given in the manuscript published by Glas. This second manuscript is of an earlier date than that of the Franciscan friar, the author being Alonzo de Espinosa, who wrote in 1580-90. The manuscript was translated

by Sir Clements Markham, and was published by the Hakluyt Society under the title of *The Guanches of Tenerife*. Espinosa agrees with Galindo in his account of the conquest by Alonzo de Lugo up to the point where the battle of Centejo was fought and won by the Guanches, after which, it will be remembered, Alonzo de Lugo went to Gran Canaria to collect a larger army with which he returned to Tenerife. From Espinosa's manuscript we learn that the Guanches fought most valiantly against the Spaniards during the second invasion of their island. The Spaniards having advanced to Laguna, a great battle was fought on the 14th of November 1494, both sides fighting with great bravery. At length, however, the invaders prevailed, and the plucky Guanches were driven from the field.

After this victory the Spaniards returned to Santa Cruz until the spring of 1495, but in the meantime, owing to the large number of dead lying about without burial, a great pestilence broke out amongst the Guanches, and the Spaniards again advanced to Laguna, making raids upon Tegueste and Tacoronte. At length Alonzo de Lugo advanced to Orotava, meeting with little resistance.

According to this story, the Guanches, seeing that the Spaniards were overrunning their land, determined to call together all their remaining men and to offer battle once again. On Christmas Day 1495 a desperate encounter took place, and at the end of the day the victory lay with the Spaniards and a great many of the Guanches were killed, including most of the chiefs.

Thus the Spaniards were able to overrun the island without meeting further resistance.

The Spaniards undoubtedly owed their victory over the natives to the terrible pestilence which had swept over the island rather than to their own prowess,

though it must be acknowledged that they had fought bravely. The conquerors chose Laguna as the seat of Government, and with the subjugation of Tenerife Alonzo de Lugo became Governor-General of the Islands on the 5th of November 1496. Thus ended the conquest of the Archipelago by Spain, in whose possession it has remained ever since.

A word may here be said of the ancient inhabitants of the Canary Islands, who held the Spaniards at bay for so many years before they were finally subjugated. In his introduction to the *Conquest of the Canaries* Major wrote: "An ethnological examination of the inhabitants of the Canaries at the time of Bethencourt's conquest, as based upon the descriptions of their persons and manners, the peculiarities of their languages and the characteristics of the mummies which have been found, leaves little reason to doubt that the Archipelago was peopled by two distinct races, viz., Berbers and Arabs, and that the tribes of the latter, which were in the minority in the Western Islands, had maintained the superiority in numbers and gained political supremacy in the Eastern."

The real home of the Guanches was undoubtedly Tenerife—in fact Sir Clements Markham has shown that they took their name from this island, *Chenerfe* being the name of Tenerife, while *Guan* meant a son; *Guanche* being a contraction of the words *Guan Chenerfe*, i.e., son of Tenerife.

Antonio Viana, a Spanish writer who published in 1604 a work on the antiquities of the Canary Islands, speaks of the Guanches as "virtuous, honest, and brave, and the finest qualities of humanity were found united in them: to wit, magnanimity, skill, courage, athletic powers, strength of soul and body, pride of character,

nobleness of demeanour, a smiling physiognomy, an intelligent mind, and patriotic devotedness."

Indeed, the more one studies the history of this remarkable race, the more is one struck by the exactness of this description, extravagant though it might at first sight appear to be. In all their dealings, especially with their enemies, the Guanches stand out as brave, straightforward men, incapable of meanness or of infidelity. Although Tenerife was their stronghold, the same race peopled the neighbouring islands of Gran Canaria and Palma, though from all accounts the inhabitants of these islands were of middle stature, while the natives of Gomera and Hierro were described by Abreu de Galindo in 1632 as small. Nevertheless, the mummies of the Guanches of Tenerife are said to be very little larger than mummies of the natives of Gomera and Hierro. I lean rather to the view that the Canary Islanders came, as Sir Clements Markham suggested, from the neighbouring African coast of Mauretania, but long before that country was overrun by the Arabs: "Mauretania was then inhabited by the same ancient Iberian race which once covered all Western Europe."

Undoubtedly the best history of these remarkable people has been handed down to us by Alonzo de Espinosa, who, writing in 1580-90, has left the earliest account of the Guanches. His manuscript has been taken as the text for Sir Clements Markham's *Guanches of Tenerife*, which, with Glas's translation of Galindo's manuscript (1632), should be consulted by everyone studying the history of these extraordinarily interesting islanders.

The student of anthropology will still find the islands of the Canary group rich in material; many ancient burial-places of the Guanches are known and numbers

of mummies have already been brought to light during the excavations which have taken place. There remains, however, a great deal to be done and many fields of research are still open. The unique collection of mummies, skulls, ancient pottery, and other relics of the Guanches preserved in the Las Palmas Museum, is one which should be much more widely known and consulted.

Turning from the history of the Canary Islands to the geological formation of the group, we come face to face with one of the most engrossing problems which has ever attracted the attention of the scientific world.

CHAPTER II

THE ORIGIN OF THE CANARY ARCHIPELAGO AND ITS POSSIBLE RELATION TO THE SUNKEN CONTINENT OF ATLANTIS.

IN the following chapter reference is made to the various periods of the earth's history, and I have thought it advisable therefore to include a short classification of geological time into which the history of the earth has been divided. The reader who has no knowledge of geology will then be able to form some idea of the Eras, Epochs, or Periods, and Ages, into which geologists have split up the various phases through which the earth has passed. "In studying geology, you must always bear in mind the imperfection of the record, whether stratigraphical or palæontological, etc., and things cannot be *dated* like historical events." This excellent advice was given me some time ago when I first turned my attention to geology, and is the best advice which a beginner can receive. Many statements are bound, from the nature of the case, to be more or less hypothetical and theoretical; hard and fast rules cannot be laid down, and further, the correlation of deposits in different parts of the world is often a matter on which it is difficult to come to any definite conclusions.

With this warning, I append a short classification of geological time as generally split up at the present day. Reference will be made in the following pages

particularly to the Miocene epoch, since it was in this epoch that the Atlantic Islands were probably formed. The geological time scale follows in general the geologic chronology for North America as set out by Professor Lull in his text-book of *Organic Evolution* (1917), and which is reproduced on p. 28.

Although our countrymen have devoted themselves studiously to unravelling the zoological and botanical problems of the Canary Archipelago, investigation of the geology of the Islands has not been seriously attempted by a single British geologist since the days of Lyell, and of recent years we have left the field open almost entirely to Germany.

Various theories have been advanced to explain the origin of the Islands, to wit :—

- (1) That they are simply of volcanic origin ; or
- (2) That they are the remaining peaks of a sunken continent of Atlantis ; or again
- (3) That they were formerly joined to the mainland of Africa.

We will begin by examining the ocean bed west of Morocco, as it is at the present day, and see what facts we can deduce to substantiate any of these theories.

Thanks to the famous voyage of the *Challenger*, and more recently to the cruise of the *Michael Sars*—to name perhaps the two most important oceanographical expeditions—the North Atlantic is the best sounded of all the oceans, and we are thus, to a large extent, able to map the bottom of the sea in this vast region as it is at the present day, at any rate as regards its main features.

Let us glance at the excellent map published in Sir John Murray's book, *The Depths of the Ocean*.

Geologic Time-Scale, after Prof. Lull.

ERAS.	DIVISIONS.	PERIODS.	EPOCHS.	ADVANCES IN LIFE.	DOMINANT LIFE.
			Recent (Alluvial or Post-glacial).	Rise of Civilisation.	Age of Man.
CAINOZOIC (Modern Life)	Quarternary	Glacial .	Pleistocene	Periodic glaciation. Extinction of great mammals.	Age of Mammals and Modern Floras.
	Tertiary .	Late Tertiary	Pliocene .	Transformation of man - ape into man.	
			Miocene .	Culmination of mammals.	
		Early Tertiary	Oligocene .	Rise of higher mammals.	
			Eocene .	Vanishing of archaic mammals.	
MESOZOIC (Medieval Life).	Late Mesozoic	Paleocene . . .	{	Rise of archaic mammals.	Age of Reptiles.
		Cretaceous . . .		Extinction of great reptiles. Extreme specialisation of reptiles.	
	Early Mesozoic	Jurassic . . .	{	Rise of flowering plants.	
		Triassic . . .		Rise of birds and flying reptiles.	
		Triassic . . .		Rise of dinosaurs.	
PALEOZOIC (Ancient Life).	...	Permian . . .	{	...	Age of Amphibians.
		Carboniferous	Age of Fishes.
		Devonian	Age of Fishes.
		Silurian	Age of Higher Shelled Invertebrates.
		Cambrian	Age of Higher Shelled Invertebrates.
EOZOIC (Dawn of Life, i.e. Primitive Life).	Pre-Cambrian				Age of Primitive Marine Invertebrates and of Unicellular Life (Protozoa, etc.).

This chart was compiled from the latest sources as recently as 1911, and is therefore comparatively up to date. The first thing that strikes us is the remarkable elevated ridge extending from northern latitudes and stretching almost to the parallel of Cape Horn. This central ridge lies almost equidistant from the shores of Africa and of America, and roughly may be said to follow the trend of the West African coast-line; the northern part of the ridge from lat. 40° to the Equator forming a half-circle, while south of the Equator, where the only gap in the ridge takes place, it runs almost due north and south. The northern portion was indicated in Lieut. Maury's Chart of the North Atlantic published in 1854, but its continuation southwards has only been made known more recently. On either side of this Mid-Atlantic Shelf, two colossal submarine valleys run parallel with one another, and these in their turn are parallel with the respective shores of Africa and America, the western trough descending in places to a depth of 3280 fathoms. The ocean trough lying between this median ridge and Africa is as deep as the submarine valley lying on the western side, and here also we find the sounding line sinks to an almost incredible depth—Monaco Deep, Chun Deep (3318 fathoms); Mosely Deep (3309 fathoms); Krech Deep and Buchanan Deep (3063 fathoms), are met with in the order named if we sail down the middle of this trough from the north to the south.

Now, as we approach the African land, the ocean depth naturally decreases, and we remark that the Continental Slope beyond the 100-fathom line is relatively steep in comparison with the Continental Shelf which ascends in gentle gradients to the shore-line.

Turning now to the Admiralty chart of the Atlantic

Ocean, one primary feature claims our attention, viz., the long line of islands situated on the median submarine ridge or lying between it and Africa. First in order, proceeding from north to south, we come to the Azores, which have been already alluded to as forming part of the median ridge; next, to Porto Santo, Baizo Island, Madeira and the Desertas, all in a little group close together, and lying much nearer to the mainland than the Azores. Continuing south, we pass the Salvages and the Pitons lying on the 30th parallel north, and then come to the large group of islands which is the subject of this book—the Canary Archipelago.

Further south again another large group is met with—the Cape Verde Islands; then again the two truly oceanic islands—St Helena and Ascension; beyond these the Tristan da Cunha group; and finally, the most interesting of all, Gough Island, practically situated on the 40th parallel south, among the most remote of all the oceanic islands in the world.

With the exception of Santa Maria Island (in the Azores group) and Majo¹ (in the Cape Verde Archipelago) *all these islands, from the Azores to Gough Island*, are mainly built up of volcanic rocks, the landmarks of a great volcanic zone. Several of these have been in active eruption within very recent times; one island in this long chain—Sabrina Island in the Azores—was formed as the result of a submarine volcanic eruption, in 1811, disappearing shortly afterwards. In the Canary Islands the terrible eruptions which occurred in Lanzarote from 1730 to 1736, and more recently in 1824, together with the small eruption which took place on the Peak of Tenerife as recently

¹ Doelter has shown that Majo is formed to a great extent not of volcanic rocks, but of slate and limestone—the remnant of an ancient land.

as the 18th of November 1909,¹ show that this region is still very much the centre of volcanic action. Speaking of these islands, Suess² remarks: "As regards a very large number of the volcanic islands of the eastern half of the Atlantic, there is good reason to suppose that the volcanoes stand on a common foundation. This is the view of L. von Buch and Hartung, and has been supported by Calderon in a recent review of the question. . . . We may affirm that the visible volcanic islands represent only a small part of the extensive volcanic regions covered by the sea."

With regard to the geological structure of the Canary Islands themselves, it was early realised by L. von Buch in 1825 that the recent volcanoes were seated on a foundation of older volcanic rocks. In a valuable treatise on the Mid-Atlantic Volcanoes, published in the *Handbuch der Regionalen Geologie* (Bd. vii., 10, 1910), Professor Gagel has given some description of the rocks of these Islands and has summarised the work of Hartung, Lyell, and other geologists.

On Fuerteventura, Gomera, and La Palma, there is evidence of a foundation of much altered effusive rocks (diabase), together with some coarsely crystalline plutonic rocks (diorite and syenite, etc.). In Fuerteventura there occur, connected with these old volcanic rocks, hard slates, clay slates, and limestones, "whereby," says Gagel, "the nature of these old basement rocks as part of a greater land mass is placed beyond any doubt."

On these older rocks are built up the recent volcanoes, their products (ashes, tuffs, and lavas) forming the bulk of the visible rocks. The lavas are largely basalts with some flows of phonolitic trachytes. Von Fritsch divided the volcanic rocks of Gran Canaria into four stages

¹ *Geog. Journ.*, vol. xxxv., 1910, pp. 59-61.

² *The Face of the Earth*, English Edition, vol. ii., p. 132.

corresponding to four periods of vulcanicity—the last having taken place within the memory of man.

The only sedimentary rocks associated with these lavas are stratified tuffs and conglomerates containing a marine fauna which shows them to be of Upper Miocene Age. These rocks are particularly well developed as a marine terrace near Las Palmas, where, according to Lyell,¹ they are intercalated with lavas (trachytes). They appear to be about the same age as the most ancient volcanic rocks of the island.

Of still more recent date is the formation of the sand-dunes which lie between Confital Bay and Alcaravanas. Professor Gagel suggests the following explanation of the origin of the sand-dunes: "Resting upon the conglomerate of the Miocene terrace is a thick marly limestone (Steppenalk). Where the limestone dust (which on firm land forms the Steppenalk) is blown into the shallow shore-water it cements the fine calcareous sand of the pulverised mollusc-shells to a porous limestone. The sand which is not cemented by calcareous dust, is blown together to form large sand-hills . . . and such dunes connect, for instance, the Isleta with the main Island (Puerto de la Luz, Isthmus of Guanarteme). The Isleta is formed of young basalt eruptive masses, which partially rest on the marine terrace."

Gagel's theory of the origin of the sand-dunes struck me as very probable, but wishing to investigate the matter further, I procured, through the kindness of Mr Head of Las Palmas, various samples of sand which that gentleman collected most scientifically and forwarded at my request to the British Museum of Natural History. There the samples were examined by Mr Campbell Smith of the Department of Minerals, who has kindly

¹ *Student's Elements of Geology*, 2nd Edition, p. 537. London, 1874.

prepared the following report on their composition and on the formation of the dunes :—

“There seems to be a popular idea, at least among visitors to the Canary Islands, that the sand which covers the Eastern Islands of the group and forms dunes at the eastern end of Gran Canaria, is brought by wind from the deserts of Africa. This idea may have received some support from the fact that Humboldt described the white sand of Graciosa as quartzose, while as recently as 1903 Taquin spoke of the Eastern Islands as covered with white siliceous sand which must be of foreign origin. On the other hand, Gagel has described these sands as calcareous sands formed by the rolling of shell fragments in the shallow water near the shore accumulated more or less *in situ*, and finally blown landwards and formed into extensive dunes. Similar accumulations of calcareous sands occur in the Bermudas and on many coral islands.

“The only sample of sand from Graciosa in the British Museum collection is a shell-sand with a certain admixture of volcanic material. It certainly contains no quartz.

“No other samples from the Eastern Islands of the group are available, but four samples of the sand from the peninsula of the Isleta in Gran Canaria have been collected by Mr S. H. M. Head of Las Palmas, at the request of Mr D. A. Bannerman. These samples were taken from various parts of the dunes which occur between Puerta de la Luz and Las Palmas. They were very carefully collected and the following observations on their composition may be worth recording.

“Sample 3, taken from the side of one of the big dunes, was examined very carefully as being probably typical of the deposit. The largest grains are 0.6 mm. in diameter, the average grain size being about 0.4 mm.

88 per cent. of the sand consists of grains exceeding 0.2 mm. in diameter ; the remainder consists of slightly smaller grains. Sample 4, from the top of the same dune, gave closely similar figures. In sample 1, from the crest of an advancing dune, 24 per cent. of the material consists of grains slightly less than 0.2 mm. in diameter, the remaining 76 per cent. of the grains being between 0.2 and 0.6 mm.

"In mineral composition these three samples are closely similar. Sample 3, which was examined quantitatively, was found to contain :—

"65 per cent. carbonates soluble in dilute hydrochloric acid but leaving a residue of finely divided clayey material. This is made up of rolled fragments of shells and limestone. It forms the bulk of the coarser grained material.

"1.4 per cent. magnetite.

"18.2 per cent. of minerals with specific gravity greater than that of calcite, consisting chiefly of augite with olivine, and ilmenite (?), some biotite and occasional grains of ægirine-augite and hypersthene.

15.4 per cent. of material less dense than calcite, composed of sanidine (about 3 per cent.), with black and brown fragments of the ground-mass of basalt and other volcanic rocks. Quartz is absent.

"Sample 2 was taken from the middle of wind-furrows in the sand, and represents the top layer of coarser material left after the finer sand has blown away. It differs in appearance from the three other samples, being darker in colour and coarser in grain. 50 per cent. of this sample consists of grains between 0.5 mm. and 1 mm. in diameter, and is composed of carbonates with a little sanidine and abundant dark grains formed of the ground-mass of basalt and of other volcanic rocks. The dark grains predominate in

this coarser grained portion. The proportion of the heavier constituents, augite, magnetite, and olivine, is quite low. The finer material is the same in mineral composition as sample 3, and shows exactly the same proportion of grains of diameter greater and less than 0.2 mm.—viz., 44 per cent. between 0.5 mm. and 0.2 mm. diameter, and 6 per cent. less than 0.2 mm.

“All the materials found in these samples of sand from the Isleta are such as can be derived from the island of Gran Canaria itself. There is abundance of limestone and shells to supply the carbonates. The residue left after the carbonates have been removed from the sand is a black sand which recalls at once such volcanic sands as occur, for instance, on Montaña Grande near Guimar (samples of which were also collected by Mr Bannerman), and which contain all the minerals mentioned above in about the same proportions and in grains of between 0.3 mm. and 0.5 mm. diameter.”

Mr Campbell Smith, in his analyses, confirms Professor Gagel's hypothesis that the dunes are formed locally, and finally refutes the old theory that the sand was blown over from the African Continent. The remarkable sand-storms which *do* occur from time to time form a special article in another place, and it will be seen that the “dust” brought by these storms is of very different composition from the sand which is analysed above.

The part of Gran Canaria from which the sand here referred to was obtained, must be well known to all those travellers who have visited the island. The Isleta consists of three conical hills at the extreme north-east point of Gran Canaria, rising to 817 feet, and separated from the rest of the island by the long isthmus of Guanarteme, the geological formation of which is here discussed. As the Puerto de la Luz—where all shipping calling at Gran Canaria lies—is

under the shelter of the eastern slopes of the Isleta, the ground in question can easily be visited by any geologist who may happen to call at the island on board ship. Those more fortunate individuals who have leisure to remain in the island will find a host of geological problems awaiting investigation.

Now let us consider the theory that the Islands are the remaining peaks of a sunken Continent of Atlantis.

The origin of the legend of Atlantis is too well known to need much attention here. The story appears in two of Plato's *Dialogues*, the *Timæus* and the *Critias*, the latter of which was never completed, and in fact breaks off in the middle of a sentence.

In the *Timæus* the principal speaker is Critias, and he is addressing himself to Socrates, the other listeners being Timæus and Hermocrates. Critias is telling Socrates what the aged Critias (the narrator's grandfather) heard from Solon, "the wisest of the Seven Sages." How Solon first heard of the Atlantis from the old Egyptian priest in the city of Sais, who described to him how the Athenians delivered Europe and Libya from the power of the Atlanteans, and finally told of the destruction of Atlantis itself.

In the *Critias*, Critias returns to his story of the war between the Athenians and Atlanteans, which had taken place 9000 years ago, and gives a minute description of the island of Atlantis, professing only to repeat what Solon was told by the Egyptian priest.

First, then, in the *Timæus*, we read the following account¹ of the words spoken by the old Egyptian priest to Solon :—

"Many great and wonderful deeds are recorded of

¹ Translation taken from Jowett's *Dialogues of Plato*, translated into English, vol. iii., pp. 445, 446.

your State in our histories. But one of them exceeds all the rest in greatness and valour. For these histories tell of a mighty power which, unprovoked, made an expedition against the whole of Europe and Asia, and to which your city put an end. This power came forth out of the Atlantic Ocean, for in those days the Atlantic was navigable; and there was an island situated in front of the Straits which are by you called the pillars of Heracles; the island was larger than Libya and Asia put together, and was the way to other islands, and from these you might pass to the whole of the opposite continent which surrounded the true ocean; for this sea which is within the Straits of Hercules is only a harbour, having a narrow entrance, but that other is a real sea, and the surrounding land may be most truly called a boundless continent. Now in this island of Atlantis there was a great and wonderful empire which had rule over the whole island and several others, and over parts of the continent, and furthermore, the men of Atlantis had subjected the parts of Libya within the columns of Heracles as far as Egypt, and of Europe as far as Tyrrhenia. This vast power, gathered into one, endeavoured to subdue at a blow our country and yours and the whole of the region within the Straits; and then, Solon, your country shone forth, in the excellence of her virtue and strength, among all mankind. She was pre-eminent in courage and military skill, and was the leader of the Hellenes; and when the rest fell off from her, being compelled to stand alone, after having undergone the very extremity of danger, she defeated and triumphed over the invaders, and preserved from slavery those who were not yet subjugated, and generously liberated all the rest of us who dwell within the pillars. But afterwards there occurred violent earthquakes and floods; and in a single

day and night of misfortune, all your warlike men in a body sank into the earth, and the island of Atlantis in like manner disappeared in the depths of the sea. For which reason the sea in those parts is impassable and impenetrable, because there is a shoal of mud in the way ; and this was caused by the subsidence of the island."

A more detailed account of Atlantis is given by Plato, vol. xii., p. 247, when Critias thus describes the mythical island: "A plain located near the sea and opening in the central part of the island, and the most fertile of plains ; about it a circle of mountains stretching to the sea, a circle open at the centre and protecting the plain from the icy blasts of the north ; in these superb mountains, numerous villages, rich and populous ; in the plain a magnificent city, the palaces and temples of which are constructed from stones of three colours—white, black, and red—drawn from the very bosom of the island ; here and there mines yielding all the metals useful to man ; finally the shores of the island cut perpendicularly, and commanding from above the tumultuous sea."¹

Ever since the above immortal lines were written by Plato, men of science have discussed the existence of a great sunken continent in this region, and although many ridicule the theory, yet there are those who still believe that the Atlantides are the remaining peaks of a gigantic island, the main body of which has long since sunk beneath the waves.

The legend has recently been revived by Dr Pierre Termier, a French scientist, member of the Academy of Science and Director of the Geological Survey of France. In a lecture given in November 1912 before

¹ Translation taken from *Annual Report*, Smithsonian Institute, 1915, p. 222.

the *Institut Océanographique* of Paris, Dr Termier reviewed the evidence in support of the existence of a sunken continent. The views which he holds may be summed up in a translation of his own words, as follows:—

“To reconstruct even approximately the map of Atlantis will always remain a difficult proposition. At present we must not even think of it. But it is entirely reasonable to believe that, long after the opening of the Strait of Gibraltar, certain of these submerged lands still existed, and among them a marvellous island, separated from the African Continent by a chain of other smaller islands. One thing alone remains to be proved—that the cataclysm which caused this island to disappear was subsequent to the appearance of man in Western Europe. The cataclysm is undoubted. . . . Meanwhile, not only will Science, most modern Science, not make it a crime for all lovers of beautiful legends to believe in Plato’s story of Atlantis, but Science herself, through my voice, calls their attention to it.”

It will be seen from his reference to the opening of the Strait of Gibraltar, that Termier places the date of the cataclysm which swallowed up Atlantis, in or since the Miocene period at latest; for I do not think there are any geologists who place the opening of the Strait of Gibraltar earlier than the Miocene; while most agree that it occurred early in the Pliocene.

In the course of his argument Dr Termier notes one salient point which was brought to light by a cable ship operating between Cape Cod and Brest, about 500 miles north of the Azores. The grappling iron which was being dragged over the uneven surface, nearly 1700 fathoms below the waves, broke off some chips from the rocks, which were brought to the surface and secured. Examination of these fragments, which are preserved in

the *Musée de l'École des Mines* in Paris, reveal the fact that they are of a vitreous lava which, according to Termier, could solidify into this condition *only under atmospheric pressure*. His deduction is that these submarine mountains were at one time exposed to the air, and the conclusion to which he points is that this region (including perhaps the Azores) was submerged "probably during the epoch which geologists call the present day, because it is so recent"; and he believes that detailed dredging to the *south* of the Azores would prove that a colossal buried region has here been abruptly engulfed. In his own words, "the bottom of the sea in these parts presents the characteristics of a mountainous country, with high summits, steep slopes and deep valleys. The summits are rocky, and there are oozes only in the hollows of the valleys."¹

In the late Oligocene and early Miocene periods began the physical disturbances which gave rise to the elevation of the Alps, and it was in the middle and latter part of the Miocene that probably the whole Alpine system of mountain folds from Morocco to the Far East (Indo-China) took place. Termier asks: "How far did this Alpine chain extend in the Atlantic region?" — and shows that in the western Atlas Mountains the folds of the Tertiary chain have been followed by a French geologist (M. Gentil) to the shore of the ocean, where these folds, gradually diminishing, "drowning themselves," descend into the waves. They there take such a course on this coast of Agadir and of Cape Ghir, that if we could follow them under the sea we should find they would bring us to the Canaries.

Summing up this evidence, Termier strongly believes

¹ Translation in English published by the Smithsonian Institute of Washington (*Annual Report*, 1915, pp. 219-234).

in the Atlantic prolongation of the Tertiary folds, "those of the Atlas Mountains towards the Canaries, those of the Alps towards the Southern Islands of the Azores."¹

It must not be forgotten that this entire chain of islands lies in one continuous volcanic zone, and that further research in the neighbourhood of the Canary Islands may substantiate new facts which will throw considerable light on the whole problem. Termier believes we have learnt all that geology and zoology can tell us about Atlantis, and he looks to anthropology, ethnography, and oceanography for the answer to the problems still unexplained.

For a scholarly criticism of the truth of Plato's legend, we must turn to the translator Jowett,² who clearly expresses his views when he remarks: "Is it not a wonderful thing that a few pages of one of Plato's *Dialogues* have grown into a great legend, not confined to Greece only, but spreading far and wide over the nations of Europe and reaching even to Egypt and Asia? . . . It mattered little whether the description in Plato agreed with the locality assigned to it or not. It was a legend so adapted to the human mind that it made a habitation for itself in any country. . . . The tale of Atlantis is the fabric of a vision, but it has never ceased to interest mankind."

Jowett, in his introduction to the *Critias*, remarks that we may safely conclude that the entire narrative is due to the imagination of Plato, who has used the name of Solon and introduced the Egyptian priest to give verisimilitude to his story, and truly notes that as many attempts have been made to find the great island of Atlantis as to discover the country of the lost tribes. Plato undoubtedly wove a romantic tale round this

¹ The Azores lie 1140 statute miles west of Gibraltar.

² *The Dialogues of Plato*, translated into English, vol. iii.

legend of an ancient land to suit his imaginative brain, and adorned his "Atlantic isle" with fabulous wealth and beauty; he even peopled it with a warlike race, the Atlanteans, whom he asserted to have been vanquished at the hands of the Athenians, his own countrymen, 9000 years before he wrote, at the same time as Atlantis was swallowed up.

Now let us for a moment look at the other side of the question. Foremost among those who entirely disbelieved in Atlantis was Alfred Russel Wallace, who considered that the legend received its death-blow from the chapter on Oceanic Islands in Darwin's *Origin of Species*. Certainly Darwin's remarks on oceanic islands helped finally to dispel the theory that the Atlantic islands are the remaining peaks of a sunken continent.

Sir Charles Lyell once visited the Canary Islands, and in the second volume of his *Principles of Geology* devoted a whole chapter to Madeira and the Canaries as types of oceanic archipelagoes. The main conclusions at which he arrived were that the Canaries were formed in mid-ocean by volcanic action and that they had never been joined to the mainland. Examination of the fossil remains tended to prove that the Islands were formed in that part of the Middle Tertiary Age known as the Upper Miocene Period. The elevation of the Islands was very gradual, and Lyell was unable to find any signs of subsidence, continual outpourings of lava having helped to pile up the volcanic accumulations to a considerable height. Evidence of this was present in Gran Canaria at a height of 6000 feet.

Lyell was a great opponent of the theory that the Canary Archipelago had once been joined to the mainland of Africa, affirming that this would involve a much greater change of level of the ocean-bed, since the close of the Miocene period, than we are justified in thinking

ever took place. In support of this he remarked on the depth of water which surrounds the Atlantic Islands.

Geikie, to a great extent, held the same views as Lyell on the formation of the Atlantides, believing each island to be the site of a volcanic cone gradually built from the sea bottom by successive outpourings of material. Tenèrife, by reason of its world-famed Peak, rising to the majestic height of 12,180 feet, has, from a geological point of view undoubtedly been more thoroughly explored than the remaining islands. If the sea could be drained from the region of the Canaries, then indeed should we be able to form some idea of the gigantic disturbance which must have occurred before such an island as Tenerife was thrown up from the floor of the ocean. As it is, we have to do the best we can with sounding line and dredge and fill in the gaps with our imagination.

Briefly, then, to sum up our conclusions:—

Geological evidence points to the fact that, with two exceptions, the islands of the Azores, Madeiras, Canaries, and Cape Verde group, are not the remaining peaks of either the mythical Atlantis of Plato or of a former continent which has sunk beneath the waves since the Tertiary days, but that they were formed by volcanic action sometime in the late Tertiary period, probably in the Upper Miocene. We have no reason to disbelieve that a sunken land *did* exist in this region in the early stages of the earth's history, long before the appearance of man in his present form; indeed there is strong evidence to support it. Professor Gregory tells us in his little volume, *The Making of the Earth*, that "the frequent interchange between land and sea is one of the best-established of geological facts." In late Palæozoic and early Mesozoic times there seems little doubt that part of the eastern half of South America,

Africa, Arabia, India, and Australia were part of a big continental mass which (according to Gregory) was called Gondwanaland, and this was separated from Arctis land, comprising eastern North America, Greenland, Norway, and Sweden by a broad ocean known as the Tethys,¹ of which the Mediterranean is the relic. Europe must then have been connected with North America, by way of Iceland and Greenland—Hull² has strongly defended the theory of a vanished Palæozoic Atlantis in this region, while Suess³ believed that this northern continent persisted as such up to a more recent epoch in the history of the earth. Later, it is supposed that the two gulfs from the Tethys stretched north and south and eventually developed into the Atlantic Ocean, leaving a ridge with deep water on either side.⁴ On the wreck of this former land mass—long since vanished below the waves—submarine volcanic activity has built up the Atlantic Isles.

¹ So named by Professor Suess.

² *Trans. Roy. Dublin Soc.*, 1885, New Ser. iii., pp. 305-320.

³ Suess, *Eng. Trans.*, vol. ii., p. 220.

⁴ For further information on this subject the reader is recommended to read *The Making of the Earth*, by Professor J. W. Gregory, F.R.S., D.Sc., from whose little book I have learnt much that is quoted in the last paragraph.

CHAPTER III

A BRIEF DESCRIPTION OF THE PHYSICAL CHARACTERISTICS OF THE CANARY ARCHIPELAGO

STRICTLY speaking, the Canary Archipelago is made up of twelve islands which fall conveniently into two main groups—the Western Islands and the Eastern Islands. The Western Islands are all large, and include Gran Canaria, Tenerife, Palma, Gomera, and Hierro. The Eastern Islands consist of two large islands—Fuerteventura and Lanzarote, with their six satellites—Lobos, Graciosa, Allegranza, Montaña Clara, the Roque del Este and the Roque del Oeste. This natural division into two distinct groups is based as much on the physical characteristics which the islands exhibit as on the position in which they lie. It is difficult at first sight to believe that the islands in the Eastern Group belong to the same Archipelago as those in the Western Group, so different do they appear from almost every point of view. Roughly speaking, Fuerteventura and Lanzarote are merely outlying parts of the Sahara Desert, and in fact are only separated from the West African coast by fifty-seven (statute) miles of sea. Indeed, at first glance one might easily believe that they had once been joined to the mainland, but a closer inspection of the islands and a survey of the ocean-bed between them and Cape Juby would soon prove this surmise to be unfounded.

For the most part, the two main islands of the

Eastern Group are low-lying, and are made up of large plains and low barren hills which only attain to any height in the north of Lanzarote (Monte Famara, 2198 feet) and in the extreme south of Fuerteventura (Las Orejas de Asno, 2770 feet). Their volcanic origin is at once apparent, and the evidence of terrible upheavals is to be seen on all sides, particularly in Lanzarote, where a long chain of craters gives this island a much more mountainous appearance than its neighbour Fuerteventura.

The Eastern Islands, then, are for the most part composed of deserts and extinct volcanoes, and are described in more detail in a later chapter. A short account may, however, be given here:—

Fuerteventura, viewed from the sea, appears to be more mountainous than is really the case—the highest ground, a basaltic mass rising to 2770 feet, lying at the southern extremity of an isthmus of shifting sand-dunes. The first impression is soon dispelled as one rides through the island—the hills on closer acquaintance are found to be low and undulating and bound great plains which stretch mile upon mile almost the entire length of the island. When I first set eyes upon these plains in the month of May, they were purple with the bloom of *Suæda fruticosa*, but otherwise, apart from a meagre desert vegetation, they are exceedingly bare and stony. Certainly in the neighbourhood of villages many acres are sown with wheat, but the corn is usually so poor in quality that it hardly serves to ameliorate the parched appearance of the country. Here and there rugged, cone-shaped volcanoes stand out conspicuously, rising from 1500 to 2200 feet, and viewed from a distance appear almost beautiful in colour, the weathered lava, pumice, and scorixæ varying in tone from a deep terracotta to dull black. As the traveller looks down upon

the plains from the central ridge, which forms a broken backbone to the island, several villages are spread out before his gaze—the little white houses scattered without plan over the desert waste. Perchance a cluster of date-palms indicates the homestead of one of the richer landowners, while only a few fig-trees or, maybe, a solitary pomegranate, mark some poor farmer's dwelling. Should the track lead near the sea the traveller will have to cross several deep *barrancos*—dry “nullahs,” often as not lined with dark green tamarisks, upon which the eye rests with pleasure after the scorching plains. Otherwise not a sign of water; not a vestige of forest land nor even a wood, in the humblest sense of the word, breaks the monotony of the scene. It seems perfectly natural to have exchanged the mules of the Western Islands for camels—the only beasts of burden in the Eastern Group.

Lanzarote is more mountainous than Fuerteventura, but the highest ground attains to only 2198 feet. Nevertheless, its surface contains much more evidence of former volcanic activity—in the shape of many extinct volcanoes, from the rent craters of which great lava-flows wind their way to the sea. A ride from north to south of Lanzarote is much more instructive of the terrible visitations through which the island has passed than would be a similar journey through Fuerteventura.

The outlying islets embrace the same general characters—flat plains, upon which miniature volcanoes stand up in vivid contrast, as typified by Graciosa; or else the half-buried lip of a giant crater-wall, so strikingly shown in the Roque del Este, rearing its crest above the waves.

The vegetation on these Eastern Islands is in keeping with their geological character—of engrossing interest

to the student of desert flora—the shrubs and plants are many of them peculiar to the islands upon which they grow. Apart from date-palms, figs, and pomegranates already noted, trees are conspicuous by their absence. Oranges, bananas, and almond-trees are decidedly rare.

As previously indicated, many of the *barrancos* are lined with tamarisks, and in all the islands Euphorbias of several varieties are perhaps the commonest form of vegetation. Wheat and beans, vines and tomatoes, are cultivated in certain districts, while quantities of onions are exported annually from Lanzarote. Through lack of water thousands of acres lie uncultivated in any way and may be classed as desert waste.

Such, then, are the Eastern Canary Islands. Owing to their having the same geological formation and uniform climate, added to the similarity in their altitude and consequent absence of variety as regards vegetation zones, these barren outliers of the Sahara are best considered as one distinct faunal area.

When we turn to the Western Islands we find a very different state of things: without exception they are all mountainous, their summits varying from 4400 feet in the small island of Gomera, to 12,180 feet in the snow-clad peak of Tenerife. The islands in this group are fairly prolific, in direct contrast to the arid waste which covers the greater part of the Eastern Islands. Save in Hierro water is fairly abundant, and in consequence cultivation has taken place over a considerable area. Certainly in parts of Tenerife and Gran Canaria, in what we will call the Maritime Zone, we meet with very much the same type of country as we found in Fuerteventura, where desert-loving plants such as *Launæa spinosa*, *Plocama pendula*, and various species of Euphorbia eke out a waterless existence, but in



Guimar, Tenerife—under the shade of the mountains.



The Garden of the Santa Catalina Hotel, Las Palmas, in 1908—
a wealth of vegetation.

the higher altitudes a very different state of things exists.

In dealing with the Western Islands of the Archipelago, I have attempted to give a brief account of the Zones of Vegetation in Gran Canaria and (in the next chapter) Tenerife, as, although the other islands—especially Palma—have been visited by botanists and I have myself ridden over Gomera, their vegetation belts have never been systematically studied; their physical characteristics will therefore only be alluded to very shortly.

The first island of the Western Group encountered when sailing westwards from Fuerteventura is Gran Canaria. It is a large island covering an area of 635 square miles, and in shape is almost round. It is $34\frac{1}{2}$ miles in length from north to south and 29 miles broad from east to west, but, owing to the mountainous nature of the interior, a journey across the island is not to be lightly undertaken. For beauty of scenery there is nothing in the other islands (excepting perhaps in Palma) to compare with Gran Canaria; but, unfortunately, the casual visitor to the island too often judges Gran Canaria from its unattractive port—Las Palmas—and from the miserable desert aspect of the scenery as seen from the “port road”! The island is not inaptly likened in the guide-book to “a basin full of mud turned upside down, with the sides furrowed by long and deep ravines,” but the writer should have added that the simile applies to the shape only, as the “basin full of mud” is now largely covered with vegetation which has transformed the once bare slopes. The ravines, or *barrancos* as they are termed in the Islands, are often of immense size; particularly fine are those of La Virgen, Aldea, Tirajana, and Fataga. The vegetation in the first named is

luxuriant.¹ In the south of the island a great stretch of country is given over to barren waste, whilst in direct contrast the mountains rise to 6400 feet, some clothed with pines, others bare as the desert, while the northern slopes are closely cultivated. Gran Canaria was the subject of an ornithological review which I published in the *Ibis* in 1912. I then divided up the island into six faunal divisions:—(1) The Monte and Vega; (2) the Cumbres; (3) the Pinar; (4) the desert-like Plains; (5) the "Charco"; (6) the Western Division, wild mountainous country. These are perfectly natural divisions, and still of course hold good. They are shown on the accompanying map, and their general features will be summarised in the following pages.

During subsequent visits to the island in 1913 and 1920, I attempted to work out the zones of vegetation. The conclusions which I formed are as follows:—

ZONE 1.—Maritime or African Zone, sea-level to 1000 feet.

ZONE 2.—The Monte Verde or District of Cultivation, 1000 to 3000 feet (including remnants of chestnut and laurel forest between 1400 and 2700 feet).

¹ In using the word "luxuriant" in this connection, the writer does not wish to convey an erroneous idea of the vegetation in the Canary Archipelago. Such qualifying adjectives when used in this book refer only to the subject in the islands under discussion. Comparison of the Canarian vegetation and scenery cannot be made with that to be found in such places as, for instance, the majority of the West Indian Islands. A traveller acquainted with both archipelagoes might think the word "luxuriant," when applied to Canarian vegetation, highly extravagant, and according to his value of the word he would doubtless be perfectly correct. Similarly, when mountain scenery is described in the following pages, the terms used must not be thought equally applicable to the great mountain ranges of the earth. Those who are familiar with Canarian scenery will at once grasp my meaning; those who are not, will, I trust, be able to picture the scenes which I have attempted to describe the more accurately for the explanation here given.

ZONE 3.—“Pinar” (Pine Forest), 3000 to 4000 feet (on the south and south-west of the island only). The country between these altitudes on the northern slopes may be included in—

ZONE 4.—“Cumbres”—mountainous, unforested area, 4000 to 6400 feet.

Zone 1, the African or Maritime Zone, includes two of my former faunal divisions—the desert-like Plains and the “Charco” of Maspalomas and Arguineguin.

This zone in Gran Canaria is characterised by semi-desert vegetation, which is best developed in the south-east of the island. From Telde to Sardina and from Sardina to Arguineguin the sun-baked plains gradually ascend from sea-level to 1000 feet, and in this belt the characteristic plants of the African Zone predominate. The barren plains are not by any means confined to the south-east coast; a particularly arid belt lies between Galdar and Agaëte in the extreme north-west, and is given over to *Euphorbia* and *Opuntia*.

Wherever practicable, as in the neighbourhood of Telde, Arucas, Guia, Galdar, etc., the earth has been turned to profitable use, and oranges and bananas are extensively cultivated. The oranges from Telde are the finest obtainable anywhere in the Canary Islands, and must be hard to beat for perfection anywhere in the world, while Guia and Galdar are famous centres of the banana trade. The western coast of Gran Canaria is practically devoid of desert land, the mountains south of Agaëte rising precipitately from the coast, while in the south-west from Aldea to Mogan it is only in the *barrancos* that cultivation (principally tomatoes) can take place. Although the western coast from sea-level to 1000 feet must be included in Zone 1, it is a very different country from that of the desert-like

plains, and was thus placed in a separate division when dealing with the strictly faunal areas.

It is not the cultivated area of the Maritime Zone which gives character to the desert wastes, but rather the endemic flora which arrests attention.

We find a shrub, or rather group of shrubs, which call for special remark, in the Euphorbias, of which Gran Canaria alone can boast of some eleven species, the commonest forms being *E. regis-Jubæ*, *E. aphylla*, *E. obtusifolia*, and *E. balsamifera*, whilst the most remarkable is undoubtedly the cactoid Euphorbia (*E. canariensis*), of which various illustrations are given in the following pages. Of the twenty-five species of Euphorbia known to exist in the Archipelago, nine are peculiar to these islands, while the other forms are for the most part found also in North Africa and the Mediterranean Basin; two species are found only in Madeira and the Canaries, and one form, *E. sulcata*, is recorded from France and Spain as well as North Africa. The shrubs belonging to the family Euphorbiacæ thrive in the most barren-looking places, and it is most surprising to come across huge clumps of *Euphorbia canariensis* growing in profusion on the forbidding lava-flow, which is such a landmark on the Telde road. This shrub is often accompanied by the very different *E. balsamifera*, and the miniature Dragon-tree, *Kleinia neriifolia*; whilst another well-known plant found growing in lava-streams and dried-up *barranco* beds, is the much more elegant *Plocama pendula*, common on many of the barren hill-sides which fall steeply to the sea coast. In fact the desert flora of the Canary Islands is a most engrossing study in itself, and one to which I should like to give much more time, the Coast Belt with all its strange African plants holding a great fascination for me.

Characteristic birds of this division in Gran Canaria are the Thick-knee (known in the island as the "*Alcaravan*"), the Courser (confined to a very small area), the Trumpeter Bullfinch, the Short-toed Lark, the Sardinian Warbler, the Spectacled Warbler, and the Rock Sparrow, though the last two are not by any means entirely confined to this semi-desert belt.

Included in this Maritime Zone is a small district known as the "Charco"—one of the few remaining spots in the Canaries where fresh-water birds and plants may find a home. It is in reality a little swamp, of which a full description is given later. It is the haven of such birds as the Coot, Moorhen, Marbled Duck, and Snipe.

Above this Maritime Zone we pass into the Zone of Cultivation—the Monte Verde—extending roughly from 1000 to 3000 feet, and embracing the division which I termed the Monte and the Vega. This includes the highly cultivated districts in the north of the island, taking in the villages of Tafira, Santa Brigida, San Matéo, Teror, Firgas, and Moya.

Here every conceivable fruit flourishes, and the vegetation, both indigenous and introduced, is luxuriant in the extreme. Vines clothe the hill-sides, growing in profusion and thriving well in the loose volcanic soil, while loquats, pomegranates, guavas, mangoes, peaches, oranges, and bananas¹ yield heavy crops of fruit. Sugar-cane is grown extensively, and in every respect this is the most luxuriant part of the island.

It is a well-known fact that soil formed by the decomposition of volcanic rocks is highly favourable to the growth of plants; almost anything put into the ground thrives provided it can obtain sufficient water,

¹ The banana principally grown in the Canary Islands is the small variety known as *Musa Cavendishii*.

and in the zone of which we are writing endless pains have been taken to ensure as constant a water-supply as is possible under the difficult circumstances. The amount of trouble entailed in watering the young corn is astonishing. In all parts of the Monte, the water is carried in cleverly-built *acequias*, sometimes along the side of a precipice, under roads and through tunnels, often for long distances, to the water-tanks, where the water is stored up until such a time as it is most urgently needed.

Many of the houses and cottages in the Canaries are a perfect joy to behold for the wealth of glorious creepers which climb in profusion over the roofs and balconies—gorgeous *Bignonia venusta*, orange and scarlet; red and lilac *Bougainvillea*, and the delicate blue *Thunbergia grandiflora* make a wealth of colour beyond the power of words to describe. The main roads are lined with fine Eucalyptus trees, and often the hedges are formed of the highly ornamental aloes, *Agave americana*. A wild geranium, which attains a great size, grows extensively in the volcanic earth, while fuchsias become large trees in the Canaries, growing, of course, entirely in the open. It is in this zone, too, that we find occasional spots of brilliant colour in the private gardens of the few English residents. Beautiful palms grow here, and in several of the better-cared-for gardens the air is heavy with the sweet scent of the Mimosa trees. A visitor from England will be at once struck, not only with the profusion of growth and wealth of colour, but by the abnormal size to which almost all one's old English favourites attain. Carnations, stocks, cinerarias, hollyhocks, begonias, giant sunflowers, nasturtiums, and many others—most of which have been brought out from England—all appear three or four times their ordinary size; while

roses of many varieties help to remind one of one's garden at home.

But there is still another side to the picture which we have not yet seen, and this is to be found in the same zone which I have termed the Monte Verde or the Zone of Cultivation. It is rather a sad side of the picture too, and must be sought between 1400 and 2700 feet. Although we cannot strictly call this a wooded belt, yet, between these altitudes we find the wreck of what were once magnificent chestnut and laurel forests. In Gran Canaria there are only five places where any trace of these forests can be found: at Doramas, 1600 feet (laurel); San Matéo, 2680 feet (chestnut); Teror, 1750 feet (chestnut); and at Los Osorios, 2480 feet (chestnut); while there remains one small patch of laurels at a lower altitude—Las Laureles, near Santa Brigida village, 1398 feet above the sea. Of these, the forest at Doramas was undoubtedly the finest; a good idea of the grandeur of this forest in bygone days can be obtained from the description given by Miss Florence Du Cane in her book, *The Canary Islands*.

Miss Du Cane, who is a botanist and deals charmingly with the trees and shrubs of the Islands, has consulted and translated various passages from the works of Viera and Don Christobal de la Camara, Bishop of Gran Canaria.

These two Spaniards, shortly after 1581, we are told, wrote of "the Mountain of d'Oramas as one of the marvels of Spain, the different trees growing to such a height that it is impossible to see their summit: the hand of God only could have planted them, isolated among precipices and in the midst of masses of rock. The forest is traversed by streams of water, and so dense are its woods, that even in the days of greatest heat the sun can never pierce

them. All I had been told beforehand of its beauties appeared fabulous, but when I had visited it myself I was convinced that I had not been told enough."

The desecration of the forest appears to have commenced between 1820 and 1830, for, according to Miss Du Cane, "At the former date some part of the woods remained in all their pristine beauty on the Moya side, and the great til-trees (*Laurus fœtens*) round Las Madres were still standing, but ten years later, when Barker Webb¹ and his companion visited this spot again, these splendid trees were shorn of their finest branches and the devastation of the woods had begun." The Spaniards seem to have done their work well, for at the present day very little remains to show that one hundred years ago such a fine forest as Viera and Don Christobal described clothed the slopes of Doramas.

Canon Tristram, who visited this part of the island in 1888, gave the following brief description of the district: "After working up the glen for three hours we clambered out on the opposite side, and emerged on what is certainly the richest piece of Gran Canaria—Doramas—not a village, but a district of scattered houses and farms with lovely pathways shaded by laurel trees, Indian fig, and various other non-European trees, to me then unknown. At the further end of Doramas is a fragment of primeval forest of laurel-trees, and here we hoped to find the "*Paloma Turquesa*." We gradually ascended till we reached a height of 4000 feet on the side of the Pico de la Virgen. In the wood I had a glimpse of two pigeons² which passed

¹ Webb and Berthelot worked in the Canary Islands from September 1828 to April 1830.

² (Though not identified, these were probably the last examples of *Columba bollei* ever seen in Gran Canaria. The species is still found in the laurel forests of Tenerife, Palma, and Gomera.—D, A, B.)

over us, and which the guide exclaimed were the "*Turquesa*."

This is the zone in which the ordinary bird-life of the island may best be observed—Sparrows, Canarian Chaffinches, Goldfinches, Linnets, Canaries, Blackbirds, Redbreasts, Corn Buntings, Blue Tits, Blackcaps, Chiffchaffs, Kestrels, Kites, Buzzards, and Quails come to mind as the species most usually seen and heard, though this short list does not by any means exhaust the forms which may commonly be met with. It may here be stated that the Monte district of Gran Canaria is by far the best centre in either that island or in Tenerife in which to observe the commoner forms of Canarian bird-life.

Between 3000 and 4000 feet lies the Zone of Pine Forest, known as the "Pinar," although the actual forest is now confined to the western and southern part of the island which lies between these altitudes; the more northern portion of Gran Canaria between 3000 and 4000 feet, although included in this zone for purposes of convenience, is in reality extremely barren and has not a single pine-tree growing upon it.

Unfortunately the natives have not been content with despoiling the island of its laurel and chestnut woods, but in like wanton manner have wrought terrible havoc amongst the pine woods, which must once have been very fine, although I do not for a moment believe that the pine forests covered the island to the extent generally supposed. At the present day most of the mountainous country in the south and west of Gran Canaria, lying between 3000 and 4000 feet, consisting for the most part of successive ridges, is sparingly covered with *Pinus canariensis*. The two upper illustrations facing pages 194 and 196 give a fair idea of this type of country. The trees have been sadly thinned by the

charcoal burners, and although there is now a fine inflicted upon anyone felling the trees with this object, the sum to be paid is a small one, the chance of detection smaller still, and the ways of evasion many. The trees cover a large extent of country, but are nowhere thick, and very little of the old timber remains.

A visitor to Las Palmas and the Monte, even should he chance to reach San Matéo (2680 feet)—the highest point usually attained by those making a stay in the island—would probably be surprised to learn what a large extent of country is under pine forest, for on the northern slopes of the Cumbres not a single pine is visible. North of a line drawn from Agaëte in the north-west to the Roque Nublo (one of the highest points in the Cumbres, 6110 feet above the sea) and continued from the Roque to Tirajana, hardly a pine is to be seen. Once having crossed this imaginary line, the ridges and spurs are covered with pine forest of the type seen in the illustration facing page 194. On the ridges above the Ardenes de Agaëte the pines come lower down the mountain slopes than I have seen them anywhere else in the island. In Gran Canaria, much of the country covered with *Pinus canariensis* is devoid of undergrowth, and as a result the seedlings which spring up are immediately destroyed by the all-devouring herds of goats which everywhere roam the countryside. No attempt has been made at re-afforestation, and if the destruction continues at the present rate, the day will come when the beautiful *Pinus canariensis* can only be considered a rarity, clinging to the uppermost crags in a last effort to avoid total extinction. It is not too late to save the Canary pine, but the Forestry Department of the Canary Islands will need a strong and vigorous chief if the islands—

particularly Gran Canaria and Tenerife—are to be forested in the future as they have been in the happier past.

Two birds in particular characterise this Zone of the Pine, and these are confined absolutely to the area under discussion—the wonderful Blue Chaffinch (see Coloured Frontispiece), and the Canarian Great Spotted Woodpecker. How few are the visitors to Gran Canaria who have ever seen, or perhaps even heard of, these beautiful denizens of the Canarian highlands. Both are discussed at length in a later chapter, so further description is here unnecessary.

The last zone, lying between 4000 and 6400 feet, embraces the “Cumbres”—the unclothed mountains scored with deep ravines, with towering precipices and jagged crests. Vegetation is here very poor, there is no well-defined belt of “fodder-plants,” such as the Escobón (*Cytisus prolifer*), and the Codéso (*Adenocarpus viscosus*), such conspicuous features of the higher levels in Tenerife immediately above the Pine belt. At about 5650 feet, a flat tableland is reached covered with loose stones and boulders, and bearing a very scanty vegetation. Above this the highest peaks of the island rise another 1000 feet, capped by Los Pechos (6400 feet).

The only birds which can truthfully be called at home in these lonely mountains, are the Raven, Egyptian Vulture, Kite, Buzzard, Kestrel, and Rock Pigeon. Another somewhat unexpected inhabitant of the highest crags, is the Red-legged Partridge, while the only Passerine bird noted up to 6000 feet was the widely-distributed Berthelot's Pipit. The fact must be emphasised that what holds good as regards the Zones of Vegetation in Gran Canaria does not necessarily apply to the other islands in the

Western Group. The islands of Palma and Gomera are much richer in forest land than either Tenerife or Gran Canaria, and the trees and giant heaths have suffered less from the ravages of the short-sighted islanders.

CHAPTER IV

TENERIFE : ITS PHYSICAL FEATURES AND THE REGIONAL DISTRIBUTION OF THE ORNIS AND FLORA.

THE island of Tenerife embraces a much larger area than Gran Canaria. It is $52\frac{1}{2}$ miles long by $31\frac{1}{4}$ broad, and covers an area of 919 square miles. By reason of its shape it has three distinct coast-lines ; the longest, stretching from the Anaga rocks to Punta Teño, faces north and north-west ; another long stretch from Punta Anaga to Punta Rasca faces mainly south-east ; while the shortest stretch from Punta Rasca to Punta Teño faces south-west. A long continuous range of mountains runs from Esperanza above Agua García to Guía and forms the main backbone of the island, culminating in the Pico de Teide (12,180 feet). This central ridge, commencing in the north at about 3000 feet, gradually rises to 8000 feet, while this altitude must be exceeded by many of the highest ridges.

At Pedro Gil—the pass between Guimar and Orotava (6600 feet by aneroid)—the mountain chain divides to encircle the Peak and to form the depression known as the Cañadas—a desolate region of undulating ridges composed for the most part of volcanic débris—pumice, cinders, lava, and scorix—lying between 7000 and 9000 feet above sea-level, and enclosed by walls of basalt and trachyte ; while in the north-west a group of volcanoes lies between the Peak and the promontory of Teño. In the extreme north-east, a smaller detached

range of razor-backed hills, peculiarly jagged in outline, attaining to a height of over 3000 feet, extends from behind Santa Cruz to Punta Anaga, and is separated from the main central ridge by the Laguna plateau 2000 feet above sea-level. Those who have examined the geological structure of Tenerife, are of opinion that the extremities of the island in the north-east and north-west—*i.e.*, the Anaga and Teño peninsulas—are of much more ancient origin than the remainder of the island, and are composed of rocks belonging to an earlier geological period—a statement which I can neither substantiate nor refute. The sides of the central backbone, from end to end of the island, are furrowed by *barrancos* which cut deep into the mountain chain. Here and there a more than usually elevated spur falls diagonally from the central ridge to the coast, entirely shutting off a wide valley from the country beyond—such is the Ladera de Guimar, over which the road passes at a height of 1500 feet.

The entire surface of the island is composed of basaltic and trachytic rocks, lava and scorixæ, cinders, ash, volcanic mud, and in certain places a fine mould, which, as on the rich Laguna plateau, is of a deep reddish-brown colour, and considering the generous supply of stones with which it is mixed, is wonderfully productive. Such, then, are the main structural features of Tenerife.

In an island rising to over 12,000 feet, every variety of temperature may be met with, but Tenerife is wonderfully blessed in this way. At Santa Cruz and Puerto Orotava, at sea-level the traveller may experience very much warmer weather than he will if he chooses to ascend to Vilaflor, the highest village in Tenerife—4543 feet. It may here be noted that there is a distinct variation in the climate on either side of the central

range, the atmosphere in the southern portion of the island being drier; the climate of Guimar on the south-east coast—a charmingly situated village on the south-eastern slopes—is hard to beat for perfection anywhere in the world.

The best centres from which to explore the island are Laguna, Orotava, Guimar, and Vilaflor. The last village is delightfully situated in the Zone of the Pine, where some of the finest specimens of *Pinus canariensis* are to be found. It is, however, difficult to reach, necessitating a long ride on a mule, either across the Cumbres, or from the town of Adeje, which can be reached by boat. The other places mentioned are all situated on main roads and are easily accessible by motor.

The writer spent part of the spring of 1920 at Guimar, and from a naturalist's point of view no better centre from which to study the flora and ornis of Tenerife can be found. It has the advantage of lying 1200 feet above the sea, overlooking a wide valley, on the lower slopes of which the remarkable semi-desert flora of the Maritime Zone is exceptionally well-developed. The village itself is highly picturesque, built, as it is, under the shadow of the mountains which completely encircle the valley and which rise immediately above Guimar to close upon 8000 feet. In the month of April, snow was still lying on the highest ridges, which added to the beauty of the scene. In Guimar absolute peace reigned; day after day the sun rose in a cloudless sky, throwing the white houses into strong relief, and accentuating the blueness of the sea; the village folk were courteous and apparently perfectly contented with their lot, going about their daily work in the fields with smiling faces and with that entire lack of "hustle," which in itself is so restful to

one born in a colder climate. The most animated scenes were to be witnessed in the early morning at the water-fountain. From sunrise onwards the feminine population, including the children, wended their way to the fountain, filled their earthenware jars or paraffintins and strolled back to their cottages, balancing their now heavy burden on their heads. Occasionally a man would arrive from some distant part of the village, leading a mule well laden with wooden kegs, which he would fill with the precious fluid. Not a drop of water is wasted in Guimar. From the fountains it is guided in a cement channel to a wide trough, where the washerwomen are always at work, beating the clothes on the stone walls and hanging the garments on the nearest bush for the sun to complete the process. The accompanying illustrations give some idea of the village life of Guimar. Unfortunately the colouring, which added so much to the picture as the writer saw it, can not be reproduced by the camera. An artist would find plenty of work for his or her brush in this charming village. Much of the architecture is very quaint, and as one climbs the steep village street, delightful peeps into shady *patios* are obtained. The villagers surround their homes, however humble, with a variety of flowers, and, as often as not, the *patios* are a mass of variously coloured fuchsias, ferns, and brightly, coloured creepers.

The Vegetation Zones of this coast of Tenerife are described at length in the following pages, and it was from Guimar that much of the work was done. From our bungalow above the village, we could gaze down upon the red roofs of the houses and upon the laurel-shaded *plaza* and gardens, to the semi-desert country beyond, conspicuous upon which is the Montañeta de Guimar—still a perfect cone, harbouring some of the



The Fountain at Guimar, and a Washerwoman.



Washing Clothes at Guimar.

most interesting plants and shrubs in the island. Two black snake-like streams of hideous lava wind their way from the volcano of Aráfo down the mountain-side, through the corn terraces above Guimar over the desert country almost to the sea, reminding us that this now peaceful village was once the scene of a terrible eruption. The volcano from which the lava poured could just be seen from the bungalow, and appeared as a tiny pyramid, lying in the middle of the Pass of Pedro Gil—the great rift in the mountains which surround the Guimar Valley. In the early mornings, and again in the evenings, the clouds would often sweep over the central backbone from the Orotava side of the range, descending at times below the lowest patches of pine forest, remnants of which lie on either side of the lava-flow and also fringe the neighbouring ridges. Whether the clouds were down the mountains, or whether, as was often the case, the hills were outlined clear against the sky, the views from Guimar were always fascinating, and but a poor idea of the beauty and serenity of this locality can be gained from the accompanying illustrations. Perhaps the evening hour, when the sun had dipped behind the mountains, was the most attractive in the whole day; the glare would suddenly vanish and the farthest objects would then stand out twice as clearly in the softer light. Over the tranquil sea the “Cumbres” of Gran Canaria seemed but half their actual distance away, and the immense Barranco de Aldea could be clearly seen, though in reality some forty miles distant.

When darkness fell, a wonderful stillness fell on the village, broken occasionally by the weird cry of the “*Pardela*”—the great sea-bird which comes ashore to breed in the crevices of the lonely *barrancos*. Often, as we lingered on the verandah of the bungalow in the

brilliant moonlight, the strange nasal cry would wake us from our reverie, as the Shearwater passed unseen just over the garden, gliding noiselessly out to sea like some restless spirit of the night.

It is not only the naturalist who finds scope for his energies in Tenerife and the other islands of the Canary Archipelago. There is still much to be learnt, by excavation, of the lost Guanche race, and hardly a new road is built without numerous remains, both human and otherwise, being brought to light. A systematic study of the collections which have already been gathered together in the principal towns would surely repay anyone competent to carry it out. The Canary Islanders to-day keep up many of the old customs, and hardly a month passes without some *fiesta* being held to commemorate some long past incident in the history of the Islands. Religious ceremonies played an important part in the life of the original inhabitants, and many are observed at the present day by their Spanish conquerors, certain days being set apart for the purpose. Of the many legends which have been handed down, none has taken a greater hold on the imagination than that of the sacred image of the "Lady of Candelaria."

Perhaps the best account of this legend is given by Alonzo de Espinosa, whose work has been quoted so often in my brief description of the discovery and conquest of the Islands. Espinosa devotes his second book¹ to a detailed history of the Virgin of Candelaria, the gist of which is as follows:—In the year 1400, when two shepherds were driving their flocks near the beach in the island of Tenerife, the sheep took fright and attempted to turn back on their path. On going forward

¹ *Vide* Hakluyt Soc. Publications, vol. xxi., second series : *The Guanches of Tenerife*.



The *Barranco* and Village of



The "Sanatorio" Bungalow, Guimar. Note pale



ville of Guimar, Tenerife.



aces of pine forest below Pass of Pedro Gil.

to ascertain the cause of their alarm, one of the shepherds beheld the figure of a woman standing upon a rock with an infant in her arms; upon her taking no notice of his signs that she should move away, he lifted his arm, threatening to throw a missile at her, but immediately it became stiff, so that he could not move it. Approaching the image in fear, his companion attempted to cut the fingers with a sharp stone, but instead cut his own fingers, those of the image-woman remaining unharmed. Thereupon the shepherds reported their discovery to the Lord of Guimar, in whose dominions the figure had appeared. Having listened to their narrative, the Lord of Guimar himself set out with his vassals to investigate their story, and found the image as the shepherds had left it. The sight filled him and his followers with astonishment, especially when no reply was made to their interrogations. All feared to touch the figure, but the Lord of Guimar commanded the shepherds who had first discovered it to lay hold upon it and carry it to his own house. The maimed shepherds thereupon went forward to carry out their lord's command, when, to the amazement of all present, as soon as they laid their hands upon it, their injuries were miraculously healed. To show his admiration of the deed, the Lord of Guimar himself lifted the image in his arms and bore it to his own house, where it was set up in a corner on the skins of goats and sheep. Not wishing to keep so great a discovery to himself, the Lord of Guimar sent messengers to the Overlord of Taoro and the Lords of Abona, Adexe, Anaga, Tegueste, and Tacaronte, summoning them to come and view the strange figure which had appeared so miraculously in his dominions. Having seen it with their own eyes, the lords of the island decided that the image should have an apartment to itself, lest the smoke of the pine-wood

in the Lord of Guimar's house should injure it. For more than forty years it remained in the house of the Lord of Guimar, or near it, in a small cave. Six hundred of the finest goats in the island were set apart as a portion of the figure's possessions and were pastured at Yguate, where no one was permitted to go on pain of death. At this time the islands of Fuerteventura and Lanzarote were under the yoke of the Spaniards, and during their raiding expeditions to the other islands a Guanche boy was seized on the shore of Tenerife, carried away to Fuerteventura, baptized, and christened Anton, and instructed in the Christian faith, but finally permitted to return to his relations in order that he might convert them. Thus it happened that Anton came to Guimar, and recognising the image as that of the Virgin, taught the lord and his people what a great prize they had in their midst. Under his persuasions it was moved to a cave close to where it had originally appeared on the sea-shore, which was later known as the Cave of San Blas. Throughout the island word went forth that the woman was the Mother of God, and the islanders came from all parts to the dedication of the cave. Anton was ordained as sacristan, and festivals were ordered to be held in her honour. When the image was in the house of the Lord of Guimar, and later after its removal to the Cave of San Blas, processions of angels appeared, and became so frequent as no longer to cause surprise to the natives; soft voices were heard, and a great company, in perfect order, with lighted candles, was often observed on the wide beach from the hermitage of Santiago to the cave in which the image rested. Moreover, on the beach called Abona, four leagues from Candelaria towards Punta Roja, these processions also took place, and the wax of burnt-out candles was found in great quantities.

It was not long before the fame of the image reached the other islands, and the Lord of Fuerteventura and Lanzarote—Sancho de Herrera—wished to possess it. Having treated for peace with the inhabitants of Guimar, Herrera landed there and attempted to persuade the lord of the district to allow him to take the image back to the Christians in Lanzarote, who, he explained, would better understand how to treat such a gift from God. Upon his request being refused, Herrera determined to steal the image, and pretending to set sail from the island with all his followers, secretly returned in the night to Candelaria and carried off the image to Lanzarote, where it was finally placed, with great veneration, in the Church of San Salvador. When night fell, lamps and candles were left burning near the image. In the morning it was found with its face to the wall, and though it was repeatedly turned towards the people, it was invariably found facing the wall again. Public prayers and penances were held to pacify the image, but all were of no avail, and finally a great pestilence came upon the islanders and destroyed a great number of them. Realising, at last, that he could not resist the Divine Will, Herrera determined to restore the image to the Guanches, and forthwith set sail for Candelaria. Strange to say, the inhabitants of Candelaria were quite unaware that the image had ever left their care, as whenever its guardians had visited the Cave of San Blas, it had always been found in its place, as was testified by many witnesses. Thus it was with difficulty, and only by producing the image, that the men of Lanzarote convinced the Lord of Guimar that it had ever been taken away. It remained in the Cave of San Blas until after the conquest of Tenerife by the Spaniards, when the Christians, holding the image in the greatest veneration, built a hermitage

for its reception on the sea-shore, close to the cave in which it had stood so long ; even then the holy image returned on two occasions to the Cave of San Blas. In the year 1530, the Bishop of the Islands placed the image in the charge of the Friars Preachers, in whose care it finally remained, though not without certain unseemly attempts by some clergy and others to turn out the Friars from the monastery they had built. For the next three hundred years the figure remained at Candelaria, and the chapel in which it rested was endowed with so many ornaments that it became the richest place in all the Archipelago. Sad to relate, in 1826, on the 8th of November, a terrible storm burst over the island, bringing in its wake a great flood from the mountains, and the holy image was swept into the sea and lost for ever. Part of the Dominican monastery was also destroyed at the same time. A substitute, which had been solemnly blessed by the Pope, was set up at Candelaria in a chapel close to the original site, but naturally it was not held in the same veneration as the figure it was designed to represent. A report on the image, as it now is, was published in 1907 by Miss Ethel Trew in Series ii., vol. xxi., of the Hakluyt Societies Publications. Miss Trew then wrote :—"The image still has a great many valuable jewels, including some emeralds of great size. They occur in a beautiful stomacher of heavy gold-work covering the bodice of her dress. Between the emeralds, the stomacher is studded with diamonds. The crowns of Virgin and Child are only silver-gilt, set with amethysts and topazes, together with a great many badly-matched pearls. The cape is of red velvet, beautifully worked with pearls and precious stones in a floral design. The *rostrillo* round the head has some beautiful emeralds and other stones."



The Guimar Road by the Lava Flow.



Candelaria, Tenerife, 1920.

Unfortunately, the magnificent ropes of pearls which used to adorn the image, together with many other jewels, were appropriated by the Spanish Government at the time of the dissolution of the monastery. Of the original resting-place, Miss Trew wrote:—"The Cave of San Blas, where the image was kept by the Guanches, on the sea-shore, is in its original state, rough and unhewn, except the front part of the entrance. There are some remarkable paintings on the wall. One, of the first Mass celebrated there by the Spaniards, is very striking. It represents a long procession coming along the shore. Alonzo de Lugo, the Adelantado, is mounted. The image is borne by four Guanche kings, crowned and wearing goat-skins, followed by a crowd of Guanches and Spaniards."

The legend here set forth is of such interest, the village by the sea so unique, that I trust the reader will forgive me for this somewhat lengthy digression. The little village on the beach—the home of "Nuestra Señora de Candelaria" for four hundred years—where the Guanches "often heard celestial sounds and saw many burning lights in form of a procession"—is shown in the illustration as it appeared when visited by the writer in the spring of 1920.

When we turn to examine the botanical riches of Tenerife, we find that the task has already been made easy, for much more attention has been paid to the flora of Tenerife than to any other island of the Canary Group. Humboldt, Hooker, Sauer, Christ, Guppy, and Salter have, in the order named, dealt with the remarkable flora of the island, and the last named has recently published an excellent paper on the *Native Flora of Tenerife*, in which the subject is clearly and concisely treated.

Before expressing my own opinions on the subject, it may be of interest to note the main conclusions at which the above celebrated authorities have arrived.

Humboldt recognised four distinct Zones of Vegetation :—

1. Zone of the Vine—characterised by the tree-like species of *Euphorbia*, *Dracæna*, *Sempervivum*, and by shrubby species of *Sonchus*.
2. Zone of the Monte Verde—laurels, holly, arbutus, ferns.
3. Zone of the Pinar—*Pinus canariensis* with *Myrica Faya* and *Erica arborea*.
4. Above the Tree Limit—Retáma (*Spartocytisus*) and a few herbaceous plants and grasses.

Dr Christ, on the other hand, divides the island into three great zones :—

1. The Coast Region, from the sea to about 2000 feet, characterised by *Opuntia*.
2. The Cloud Region.
3. The Alpine Region, above the cloud-belt.

Guppy recognises six belts :—

1. The African Zone, from sea-level to 2000 feet.
2. The Cloud Region, 2000 to 5000 feet, characterised by the Laurel Forest.
3. The Pine Forest Belt (including the remnant of the Juniper), from 5000 to 6500 feet.
4. The Codéso Belt, from 6500 to 7000 feet, characterised by *Adenocarpus viscosus*.
5. The Retáma Belt of the Cañadas, from 7000 to 9000 feet, characterised by the Broom *Spartocytisus nubigenus*, which in places reaches to 11,000 feet.

6. The Alpine Zone, from 11,000 feet to the summit of the Pico de Teide, which is characterised by a violet (*Viola teydea*) and a lichen.

Lastly, we have the thoroughly up-to-date opinions of Dr J. H. Salter, whose treatise on the *Regional Distribution of the Native Flora in Tenerife* appeared as part viii. of vol. lxii. of the *Manchester Memoirs* (1918).

Dr Salter, with Dr Christ, recognises three main regions:—

A. *The Coast Region and Lower Slopes*, from sea-level to 2400 feet, comprising (on the southern coast ¹)—

1. Foreshore.
2. Desert (stony, rocky, or black sand).
3. Orchards, plantations, vineyards (banana, tomato, orange, vine), extending to about 1300 feet.
4. Cultivated lands (wheat, potatoes, lupins, broad beans), extending to about 2060 feet.

B. *The Cloud Region*, 2300 to 5300 feet—

1. The Monte Verde, from 2400 to 4000 feet, characterised by woods and thickets of evergreens (far from being a continuous belt).
2. The Pinar, from 4000 to 6000 feet, characterised by *Pinus canariensis*.
3. Zone of shrubby foliose, Leguminosæ, the Escobón (*Cytisus prolifer*) and the Codéso (*Adenocarpus viscosus*) — the chief fodder-plants—6000 to 6500 feet.

¹ Upon the northern slopes the desert strip is much reduced or altogether absent.

C. *Above the Clouds*, 6500 to 12,180 feet¹—

1. The Cañadas, Zone of the Retáma (*Spartocytisus nubigenus*), reaching to almost 10,000 feet.
2. From 10,000 to 12,180 feet, an endemic viola, a moss, and a lichen occur.

During my several visits to Tenerife while studying the avifauna and completing the magnificent collection of Canarian birds which we have at the British Museum, my various expeditions took me to many points of the island which Dr Salter explored, and I formed the very highest opinion of his work. I do not, therefore, wish to claim that any of my observations are original, but rather, in so far as my knowledge goes, bear out those of the distinguished botanist whose memoir has proved of such service to me when studying the faunal zones. On the whole, the Zones of Vegetation in Tenerife are more clearly defined than in Gran Canaria, though I would like to emphasise the fact, as already pointed out by Dr Salter, that owing to (1) the range in climatic conditions, (2) the different amount of rainfall registered on (a) the northern slopes, (b) the southern slopes of the island, and (3) the varied nature of the substratum, there is considerable variation in the distribution of the plant-life in the island, and consequently much overlapping. Strict demarcation of the Vegetation Zones is very difficult, often impossible—the evergreen woods are naturally more developed on the northern slopes, where water is more plentiful, than upon the dry southern slopes. It follows that, as we found to be the case in Gran Canaria, it is anything but easy to define the

¹ Dr Salter gives this as 12,912 feet. I am informed at the Royal Geographical Society that, according to the latest maps, the Peak of Tenerife was ascertained to be 12,180 feet in height.

faunal zones, these being so largely dependent on the distribution of the flora.

In dealing with the Zones of Vegetation, I accept the altitudes laid down by Dr Salter in his paper.¹ In working the island myself I have studied this question rather from the point of view of the ornithologist, marking off the zones according to the altitude at which certain birds occur. I find, as might be expected, that the conclusions at which we arrived vary very little; what variation exists can probably be put down to the difficulty of demarcating the zones closely, rather than to any real difference of opinion. I took my altitudes from an absolutely reliable aneroid, which I always carry. We will first examine, one by one, the three main divisions—the characteristic endemic plants are those instanced by Dr Salter, the majority of which I have also seen myself; the birds recorded are from my own observations.

Zone A. The Coast Region and Lower Slopes.—Sub-division 1: The Foreshore and Coast-line. The study of this narrow belt has been carried out chiefly on the south and south-eastern coast-line from Santa Cruz and Guimar, and from journeys up and down the coast on land and in small coasting vessels, which, in the daytime, run very close in-shore. In one way or another, the entire shore-line from Guia to San Andrés has been cursorily surveyed. Much of the coast consists, especially in the extreme north, of steep cliffs of considerable size, dropping abruptly to the waves; but in the south, particularly between the headlands of Punta Rasca and Punta Abona, much of the shore-line is very flat; black basaltic reefs occasionally fringe the coast, while at many points little bays

¹ Excepting the altitude given by him of the Pico de Teide. See footnote on preceding page.

of black volcanic sand break up the foreshore. On the rocky parts of the coast occurs *Astydamia canariensis*. Here, under the boulders fallen from the cliffs, the Little Allied Shearwater (*Puffinus assimilis baroli*) and the night-flying Bulwer's Petrel (*Bulweria bulweri bulweri*) may be sought for in the breeding season, nesting under the huge rocks which so often line the foreshore. Here, too, are to be found the nesting holes of *Calonectris kuhli fortunatus*, the Great Canarian Shearwater, or "*Pardela*" as it is locally called, though unlike the smaller Shearwater the "*Pardela*" often flies some way inland, nesting in the sides of *barrancos*, in old craters, and even in the lava flows; its weird call may usually be heard on a May evening above the roofs of the village of Guimar, 1200 feet above the sea!

The Heron is a breeding bird round the coasts, and where the cliffs are high, the beautiful Osprey may perhaps be seen. This is the sub-zone in which wading birds—such as the Kentish, Common and Lesser-ringed Plover, the Turnstone, Common Sandpiper and Whimbrel, and many birds of passage belonging to the Order Charadriiformes, must be sought, frequenting, as may be guessed, the parts of the shore where the coast is low and open.

The foreshore vegetation is varied and cosmopolitan in character, representative of such genera as *Mesembryanthemum* and *Frankenia*. Euphorbias are represented by *E. Peplis* and *E. Paralias*, *Argyranthemum frutescens*—the Paris daisy—and one or two species of *Beta*, besides *Polycarpæa Teneriffæ* and *Forskohlea angustifolia*, representing the endemic flora.

Sub-division 2 is that of the desert, and this type of country is mainly to be found on the south and south-east coasts, whole stretches of country being there given up to barren desolation. On the northern





The Aráfo-Guina



The Valley of Guimar. N



Lava Flow, Tenerife.



The lava flow from the Aráfo Volcano.

slopes of the central ridge, *i.e.*, from Punta Hidalgo to Punta Teño, this desert land is almost non-existent. On these more favoured slopes the ground is cultivated almost from the foreshore, acres of land being under bananas, etc. A very different state of things exists on the south-eastern shore-line, as can be easily seen by following the southern coast road from Santa Cruz to Fasnia, just beyond which the road ends. Once the grain fields in the immediate neighbourhood of the Cuesta are left behind, the country becomes more and more barren. Miles of rock-strewn country are given over to the ugly prickly pear (principally *Opuntia coccinellifera* or *O. Dillenii*), a species very largely cultivated in the Canaries, as the home of the cochineal bug, between 1831 and 1874, when the discovery of aniline dyes spelt death to the Canarian industry.

While on this subject it may be noted that cochineal is still much cultivated in the Islands, principally because the *Opuntia* thrives on ground from which it is impossible to produce anything else. It is also an industry which requires little heavy labour, and in consequence suits the indolent temperament of the Canarian peasant. As is well known, the prickly pear almost grows itself—every detached segment taking root, often when not desired to do so at all. The spines are easily cut off, and the “leaves” can be “dusted” by children with grass brushes or mops. The cochineal bug is “caught” with the minimum of labour; a white cloth being spread over the now spikeless leaves, the insect is at once attracted to it, and in a short while all the cochineal insects gather on to the cloth, which is then removed and the precious creatures collected.

Since the war I have noticed, at any rate in Gran Canaria, that an effort has once more been made to

re-establish the cochineal industry, and whatever the result may be, it is never likely to die out entirely in islands so eminently suited to its "cultivation."

The main road to Guimar passes through this land of *Opuntia*. The only tree is the fig, which seems to thrive in the most arid localities, taking root and even bearing fruit in the lava-flows upon which even *Plocama pendula* finds difficulty in growing. Mile upon mile the road winds through a desolate country, terraced in the most elaborate fashion almost to sea-level. Indeed this elaborate system of cultivation is nowhere better illustrated than in the valley of Guimar, and in the depressing country lying between Guimar and Fasnía. The small amount of rain which may usually be reckoned upon to fall during the winter months is nowhere sufficient for the crops, and, as in Gran Canaria, the water has to be guided in pipes or *acequias* (cement water-courses) from the mountains, often for very great distances. The semi-desert vegetation is well developed over a large proportion of this southern coast belt. The candelabra-like *Euphorbia canariensis* seems to be as much at home clinging to the mountain-sides, as on the Anaga promontory, or on the open plain near the Punta Rasca lighthouse; while other members of this genus characteristic of the desert sub-zone are the arborescent species, *E. obtusifolia*, *E. balsamifera*, *E. regis-Jubæ*, and *E. atropurpurea*, while Dr Salter found the curious species *E. aphylla* extending round the promontory of Teño to Buenavista on the northern coast. Of the other many remarkable forms of plant-life, the most noticeable species perhaps belong to the genera *Sempervivum*, *Sonchus*, and *Echium*, all of which and many other strange forms will be found enumerated in Dr Salter's comprehensive list, which should be



The Prickly-Pear (*Opuntia*) Belt in Tenerife.



Remarkable Terracing on the Guimar-Fasnia Road.

consulted for details. In the valley of Guimar three separate lava-flows may be seen, winding their way down the slopes from a height of 5000 feet almost to the sea. Two of these rivers of lava are said to be the result of an eruption which took place in the year 1705-6, and the other stream, composed of much more weathered lava, is of considerably more ancient origin. The comparison between the vegetation on these lava streams is of the very greatest interest. At first sight the flows nearest to Guimar—emanating from the Volcan de Aráfo—(whose cone appears in the illustrations facing pages 66 and 76 as a tiny pyramid in the centre of the Pedro Gil divide) seem to be devoid of any vegetation with the exception of a grey tufted lichen (*Stereocaulon denudatum*, Fries., var. *pulvinatum*, Th. Fr.), which clings thickly in every direction; but a closer examination showed that plants and even trees were at last commencing to gain some hold on this dreary waste. Of the trees, a few pines (*Pinus canariensis*) are to be found where the flow passes through this belt, and at a lower elevation the fig-tree appears, seeming to take root in the very rock itself. A careful search revealed the presence of three or four other species, but only a few individual plants of each kind were noted. Conspicuous amongst these was *Kleinia neriifolia*.

The vegetation on the old weathered lava-flow proceeding from the Montañeta de Guimar is in direct contrast to the scanty vegetation to be found in the more recent streams, as can be seen from the illustrations facing pages 76 and 98.

The desert sub-zone, especially that part of the belt in the neighbourhood of Guimar, has been carefully examined by Dr Salter, who gives the following interesting account of the region:—

“The native vegetation of the coast-belt, including the arid rocky ravines which furrow it, illustrates every possible adaptation to semi-desert conditions. With the exception of the fresh green of *Plocama*, its general aspect is grey, many plants being either glaucous or covered with a silky, mealy, or hoary pubescence. The leaves of others contain aromatic or acrid principles, while another group (*Sonchus spinosus*, *Lycium afrum*) depend for protection upon their tough wiry nature and armament of spines. Reduction of leaf-surface is seen in *Reseda scoparia*, *Convolvulus scoparius*, and in the numerous ‘switch plants,’ such as *Retama Spachii*, *Plocama pendula*, *Sonchus leptcephalus*, *Linaria spartea* and *scoparia*, *Campylanthus salsoloides* and *Asparagus scoparius*. The plants of the sun-scorched *barrancos* are extremely deep-rooted, and many (as the larger species of *Sempervivum*) only flower at the expense of nutriment accumulated in the course of several or of many years. These characters are nowhere better seen than in the vegetation of the old lava-flow which has issued from the Montañeta de Guimar. The latter is still a perfect cone, with the sides of its crater overgrown with vegetation. Here are vast thickets of the cactus-like *Euphorbia canariensis*, each stiff quadrangular column beset with four rows of spines. It is often overgrown by the climbing Asclepiad, *Periploca laevigata*, known as ‘cornical’ from its horn-like fruits. Inter-mixed with the thickets of *Euphorbia*, and profiting by the protection which they afford—no small matter when all-devouring goats everywhere range at large—are other desert shrubs such as *Sonchus leptcephalus*, the white-powdered, yellow-flowered *Cneorum pulverulentum*, *Messerschmidia fruticosa* (Boraginaceæ) and *Asparagus arboreus*.

“The curious Asclepiad, *Ceropegia dichotoma*, appears



A *Barranco* in the Valley of Guimar, Tenerife.



Desert Vegetation in a *Barranco* near the Sea, Tenerife.

Euphorbia obtusifolia on the right of the picture.

as a cluster of fleshy, upright, jointed meal-covered stems, having thus much the appearance of a bunch of wax candles. The few grasses, as *Aristida cærulescens* and *Tricholæna Teneriffæ*, are of characteristically desert type. Near at hand upon the loose black sand *Plocama pendula* shows its graceful drooping shoots and *Sonchus spinosus* suggests a tangle of barbed wire. It has no foliage leaves after the seedling stage, and is often spun up by *Cuscuta*. *Citrullus Colocynthis*, with its gourds the size of oranges, straggles over the heated surface of this miniature Sahara. Of the leafy arborescent species of *Euphorbia*, *E. regis-Jubæ* and *E. balsamifera* are highly characteristic of this region, growing under favourable circumstances to 4 m. in height. In exposed situations on the coast the latter species becomes prostrate, and the extraordinary appearance of a mass of writhing, fleshy arms presented by ancient specimens, leafless, contorted, riven and half dead, is as remarkable as any aspect of vegetation in the island. Very similar in appearance to *E. regis-Jubæ* is *Kleinia neriifolia*; it has the habit of a miniature Dragon-tree, and is in fact an arborescent *Senecio*. Considerable uniformity marks the vegetation of this desert-belt, which is found bordering the whole of the south-eastern coast. It is prolonged up the south-western coast, and even extends round the promontory of Teño to Buenavista on the northern coast, where all the plants mentioned, including *Ceropegia*, were seen in profusion, with the addition of the curious *Euphorbia aphylla*. From this point onward the steeper and comparatively well-watered slopes of the northern coast allow small scope for the development of the desert flora, but wherever conditions are favourable, as where a lava-flow has made its way down to the sea, the familiar forms reappear."

The above account of this remarkable country—to

my mind by far the most interesting sub-zone (from a botanist's stand-point) to be met with in the Islands—is so complete and so descriptive of the whole of this belt that I have very little to add from my own experiences. I visited the Montañeta and the old lava-flow on the 19th of April 1920, and the accompanying photographs were then taken. The volcano is, as Dr Salter remarks, a perfect cone, the rim of the crater rising on the south-west side to 1000 feet, while on the north-east side it falls to 900 feet. The outer walls on the sea-side, especially towards the summit, are well covered with vegetation, principally *Euphorbia obtusifolia*; *Launea spinosa*, then covered with small yellow flowers, and a few of the cactus-like *Euphorbia canariensis*. Amongst the smaller vegetation the common Paris daisies (*Argyranthemum frutescens*) and a dark-centred dandelion (*Picridium tingitanum*) were the most plentiful; whilst at the summit of the rim, growing amongst the cinders and ash, a small plant with a minute white flower was later identified as *Micromeria hyssopifolia*. Inside the rim the crater walls fall steeply to form a perfect cup, the sides covered thickly with plants of *Euphorbia canariensis* and *Euphorbia balsamifera*, the former often sheltering the prickly-leaved *Rubia fruticosa*. The curious plant known as the “miniature Dragon-tree” (*Kleinia neriifolia*) was here seen growing very plentifully. Paris daisies, the prickly *Launea spinosa*, and the bright green *Plocama pendula* were everywhere in close association, whilst at the bottom of the crater several fig-trees were thriving, sheltered from every wind by the high walls of the cone. Extending for some distance round the Montañeta, and covering the lower slopes, was the thick black sand—samples of which, analysed at the Natural History Museum, were found to consist of olivine, augite, basalt, with felspar



Vegetation inside the Rim of the Montañeta de Guimar.



Euphorbia balsamifera.

On the Rim of the Crater of the Montañeta de Guimar.

and a little magnetite or ilmenite. Mr Campbell Smith, who made the analysis, was of opinion that it must fall as dust from eruptions of the volcano, but he was at a loss to suggest how it came to be graded so evenly.

Some remarkably fine specimens of the graceful *Plocama pendula* were clinging to the face of the rocks at the foot of the Montañeta, the bright green whip-like branches contrasting with the black basaltic rocks in the background. On the black sand below the *Plocama* bushes, examples of *Launea spinosa* covered with a formidable array of spines were to be seen. Riding over this wide stretch, we passed on to the ancient lava-flow itself, now almost covered with the wonderful variety of vegetation described so well by Dr Salter. As far as the eye could reach in the direction of the sea magnificent specimens of *Euphorbia canariensis* were growing, in many cases almost hidden by the plants which seek protection amongst their impenetrable candelabra-like spine-covered stems. There is no more wonderful example of adaptation for the purpose of preservation than that afforded by the plants on this lava-flow. We have seen a large *E. canariensis* almost throttled by the climbing *Periploca laevigata*, the latter bearing curious fruit like the two horns of an ox, twisting and climbing all over the giant Euphorbia, thus protecting itself successfully from the ravages of the goats. Dr Salter has, in the paragraph quoted by me, enumerated the various species which, like the "cornical," take advantage of this Euphorbia. *Rubia fruticosa*, each leaf armed with tiny hooks of its own, is, after the *Periploca*, the shrub most commonly found in this association, not content with the protection afforded it by its own prickly leaves.

The upper illustration facing page 98 shows this lava-flow; the plants which can be recognised being, in the background, *Euphorbia canariensis*, several of which are being half-throttled by the climbing *Periploca laevigata* and *Rubia fruticosa*, the two last showing as a dark mass amongst the lighter coloured arms of the cactus. In the foreground, the whitish "fluffy-looking" plants are in reality specimens of the prickly *Launea spinosa* covered with small yellow flowers and "down"—the spines can just be made out in the specimen on the extreme left of the photo, which is slightly out of focus. The larger, darker coloured shrubs with whip-like branches are examples of *Plocama pendula*.

It now only remains for me to describe the birds which I met with during my rambles along the coast. The two true desert species—the Courser and the Trumpeter Bullfinch—are almost confined in Tenerife to the plains on the extreme southern coast in the neighbourhood of Adeje. In the part of this belt lying between Santa Cruz and Fasnia, birds cannot be said to be plentiful either in number or in the variety of species represented. The commonest forms met with, as, for instance, the Short-toed Lark, Berthelot's Pipit, the Kestrel, the Raven, and the Rock-dove, are, save perhaps the first noted, none of them typical desert species; the Pipit is one of the most universally distributed of the island birds, while the Rufescent Short-toed Lark is equally at home—at any rate in spring and summer—on the Laguna plateau, and the other species mentioned are almost as universally distributed as the Pipit. Perhaps the most characteristic bird, and that which best "fits in" with the landscape, is the Madeiran Rock-sparrow. One may cross acres of this desert land without seeing a single sparrow,

when suddenly a large flock will be encountered, one bird after the other springing up from the ground to settle again fifty yards further on and immediately become invisible. Another bird which always recalls to me this scorching desert-belt is the Canarian Grey Shrike; it may be seen sitting motionless, but ever watchful, on one of the cactus-like stems of the *Euphorbia canariensis*, from which it utters its peculiar whistle, flying at the slightest approach of danger. It may also be seen amongst the fig-trees on the higher levels of this belt, but not in anything like the numbers in which it was noted in the truly desert eastern islands—Fuerteventura and Lanzarote.

It is in this zone principally that the Thick-knee must also be sought, although I believe the "*Alcaravan*" is much more plentiful in Grand Canary than it is in Tenerife—even on the sun-baked plains of the south. In the walls of the *barrancos* several birds find convenient nesting sites, particularly the Pallid Swift, which, though universally distributed, prefers the plains and low-lying slopes to the higher mountains, where its place is taken by the smaller Black Swift.

Yet another conspicuous bird of the plains which is not by any means confined to the desert area is the Hoopoe, which never fails to attract attention and excite admiration. Wherever trees such as the orange, lemon, loquat, pepper, fig, and other fruit-trees make their appearance in any numbers, as, for instance, in the garden of a well-cared-for *finca*, they invariably attract birds from the zone above, among them the Blue Titmouse and the Blackbird, the widely distributed Chiffchaff, Grey Wagtail and Canary, the last named found from sea-level to the highest ridges.

Sub-division 3 of the Coastal Region includes the orchards, plantations, and vineyards, and these are

particularly to be found on the long northern coast. From Tejina to Garachico the semi-desert flora of the South has, save on the few lava-flows which wind their way to the sea, little opportunity to assert itself; every valley and every stretch of land capable of bearing fruit has been utilised. As every visitor to Orotava knows, the beautiful valley has now become an enormous banana plantation, but despite the acreage given over to the cultivation of this fruit, palms, oranges, and evergreen trees are sufficiently numerous to attract many birds from the higher zone of the Monte Verde. Warblers, Blackcaps, Wagtails, Canaries, Blue Tits, Blackbirds, Goldfinches, and most of the birds of prey — Egyptian Vultures, Kites, and Kestrels in numbers, may be seen almost any day of the year in the valleys of the northern coast. No more favoured spot in which to observe, at any rate the Passerine birds mentioned, can be found than the beautiful Botanic Garden on the main road from Santa Cruz just before Orotava is reached. Here an excellent collection of exotic plants and trees has been got together, and many very fine tropical and sub-tropical species have been successfully introduced, particularly noticeable being the variety of palms. A magnificent scarlet hibiscus was perhaps the most gaudy of the many beautiful things seen on the occasion of my last visit in April 1920. The garden is one that no visitor to Orotava should fail to visit, and those having more than a passing interest in such things will doubtless spend many delightful hours there. Most of the birds, other than the Hawk family, noted above, may be seen at close quarters midst the wealth of vegetation in this garden, in addition to which, in early spring, I have seen quite a number of Continental Thrushes in the branches of the higher trees. This

sub-species, which is a winter visitor to Tenerife, and is then remarkably shy, usually frequents the higher and cooler altitudes, where its wild behaviour is in great contrast to its more confiding ways when in our gardens and shrubberies in England.

The last sub-division of this zone recognised by Dr Salter is that of the cultivated lands (wheat, potatoes, lupins, and broad beans); no better example of this sub-zone can be found than the broad saddle of the Laguna plateau, lying at 2000 to 2400 feet. This is a splendid corn country, many acres of wheat, maize, and beans being closely cultivated. The land in the neighbourhood of Laguna is particularly rich, and the crops raised in this well-watered district are second to none. The atmosphere in this delightful old town—the ancient capital of the island—is appreciably colder than Santa Cruz, and in consequence Laguna is the recognised summer resort when the heat is oppressive in the Port. In winter it can be really cold at Laguna, and the fresh “nip” in the air is conducive to long walks, many beautiful excursions being within easy distance. Laguna is described more closely elsewhere, and an illustration is shown facing page 88 of the valley in which the once famous lake—from which the town takes its name—must have lain. Essentially a corn-growing district, there are nevertheless quite a number of trees in the neighbourhood—eucalyptus, laurels, palms, figs, and orchards of fruit-trees. In consequence, bird-life is perhaps more plentiful here than anywhere else in the whole island, characteristic species being Thanner's Corn Bunting and the Short-toed Lark. The former is to be heard on all sides, uttering its “sizzling” note perched on the telegraph wires or the topmost branch of every available bush, from which prominent position it can survey the countryside to its heart's

content. The Rufescent Short-toed Lark—a rufous-coloured race peculiar to the island—is not at first in such evidence as the Corn Bunting; however, once they are located in a ploughed field, the ground seems to be alive with them, and later they may be seen on all sides rising from the waving corn into which, when their short sweet song is ended, they sink once more with fluttering wings and extended tail. In the orchards and bramble thickets many other species are met with; Tenerifean Blue Tits climb about the fruit trees, Grey Wagtails run fearlessly along the stone water-courses or chase one another along the roofs of the houses. Brown Linnets and Goldfinches assemble here in flocks, and the song of the Blackcap resounds from the more sheltered thickets. Two other members of the Warbler family are to be seen here—the Canarian Chiffchaff and Spectacled Warbler, the latter one of the most charming little birds to be met with anywhere in the Archipelago. Of the Hawk family the Canarian Kestrel is undoubtedly the most plentiful and can usually be seen poised motionless in the air, on the watch for its luckless prey. It is from the Laguna plateau that many of the rarer birds of passage have from time to time been recorded. When the ditches are flooded, rails and water-birds have often been obtained here, as may be seen by glancing at the list of these birds in Appendix B. The plain is bounded on two sides by low grass-covered hills—upon which the giant heather and broom is found growing in patches, whilst wide spaces in early spring are alternately carpeted with the yellow *Rapistrum rugosum* and purple *Echium plantagineum*.

Above the elevation of the Laguna plateau we pass out of the Coastal Region into the second well-defined *Zone of the Cloud Region*, the first sub-division of which is the Monte Verde, extending from 2300 to 4000 feet



The Landing-stage, Santa Cruz de Tenerife.



A Valley in Tenerife, and a fine *Agave americana*.

above the sea, a region which in days long since gone by was perhaps a continuous belt, but which can now own to only a fragment of its past glory. As may be implied from the name it bears, the "Monte Verde" is the region of evergreen woods, of cool dripping *barrancos*, and still, in many secluded spots, of really luxuriant vegetation. Bathed in cloud for a great part of the year, the trees and shrubs of this favoured belt often attain to a remarkable size, and if allowed to do so, would soon cover a much greater area than they do at the present day. As might be expected, the Monte Verde is principally developed on the northern slopes of the central ridge, but is continued on the south-eastern slopes in intermittent patches from above Laguna to the Ladera de Guimar. From here southwards the typical vegetation of this belt seems to have died out or never to have developed except for wide stretches of country covered with *Cistus*; much the same type of vegetation exists as is to be found on the western slopes of Gran Canaria in the Tirma district immediately below the Pine Belt. This state of things is to be expected when we remember the difference in rainfall between the southern and the northern slopes of Tenerife.

There are still some really fine patches of forest remaining in Tenerife, other than pine, the best known perhaps being the woods of Mercedes, clothing the hills which on the north-east bound the wide basin of Laguna. These woods commence at an altitude of 2500 feet, and the highest ridges must be 3000 feet above sea-level. The trees, principally Canarian laurels (*Laurus canariensis*), and a few giant heath (*Erica arborea*) are sufficiently thick to ensure one walking in shade during the hottest part of the day. The undergrowth in the forest is not very thick, but is very

varied. Messrs Sprague and Hutchinson of Kew Gardens, who visited the forest in 1913, collected forty-five different plants in one day, remarking particularly *Prunus lusitanica* in great abundance, *Ixanthus viscosus*, *Senecio appendiculatus*, and the beautiful mauve-coloured climber, *Convolvulus canariensis*. The forest of Mercedes is a delightful retreat on a hot, breathless day; little rivulets have cut narrow gorges through the wood, their banks a mass of ferns and mosses; the atmosphere is damp and cool, wonderfully refreshing after the glare of the hot sun, which seems to strike with double its usual vigour as one emerges from the shade of the laurels.

It was on the outskirts of Mercedes, amongst tangled brambles, brake-fern, and thistles, where in Spring the open grassy hill-sides are alternately covered with the pretty yellow *Spartium junceum* and the purple *Echium plantagineum* that I first met with the Superb Redbreast (*Erithacus rebecula superbus*), the beautiful dark-chested "robin" confined to the Monte Verde in Tenerife and Gran Canaria. Later I found it to be really plentiful in the tree-heaths above Guimar, but this part of the Monte Verde will be described later on, as it is entirely different in "composition" from Mercedes. As soon as the true forest is entered we meet with a bird which is only seen very rarely in the zone below. This is the Canarian Chaffinch, of which much will be said in another chapter. It is one of the commonest birds in the forest, and, like all Chaffinches, is very tame and can be closely observed. Not so confiding, but almost as plentiful, is Cabrera's Blackbird—a Canarian race named after a distinguished Canarian ornithologist—Don Anatael Cabrera—whose fine collection of Tene-rifean birds may be seen in the Institute of Laguna by

anyone interested in the subject. Of the other birds noted, the most plentiful were Blue Tits and Chiffchaffs.

Another beautiful wood is that of Agua Garcia above Tacoronte. Here fine specimens of the Viñatigo (*Persea indica*) are to be seen, and the largest tree-heaths (*Erica arborea*) in the island grow in this neighbourhood. Further, Agua Garcia woods are the only ones where the large-leaved holly (*Ilex platyphylla*) can still be seen, while the small-leaved Canarian holly (*Ilex canariensis*) also occurs. The native "til" tree (*Oreodaphne foetens*) is now, according to Dr Salter, restricted to the Barrancos Castro and Ruiz, localities which I have not had an opportunity of visiting. The fourth species of laurel, also peculiar to the Canaries, is *Phæbe barbusana*, now restricted to three or four localities, but still to be seen above Orotava. Conveniently reached from the latter locality are the chestnut groves of Agua Mansa, while on the opposite side of the ridge chestnuts again appear, but only very sparingly, above Guimar and Aráfo at a height of 4600 feet, encroaching here on the Zone of the Pine.

No better centre for the study of the various zones can be found than Guimar. The Monte Verde is well marked off in this part of the island, and no more instructive ride can possibly be taken than that from the Montañeta de Guimar, situated in the desert coastal belt close to the shore, through the closely cultivated lands to the clearly defined Monte Verde. Above this in successive "tiers" the pine forest, the belt of the two fodder-plants—the Codéso and the Escobón—and finally the Retáma Zone are entered. The Monte Verde above Guimar consists of low evergreen scrub, mainly tree-heath (*Erica arborea*), the faya (*Myrica Faya*), the small-leaved holly (*Ilex canariensis*), and *Cistus*. The first heaths above Guimar are met with

at an altitude of 2700 feet, while the lowest pines are entered at 3300 feet. The evergreen scrub encroaches upon the pines, and in the wide stretches of hill-side where the "Pinar" no longer exists, the heaths grow to a much higher altitude. The moment that one enters the Zone of the Heaths, the presence of birds is felt, accentuated, no doubt, by the comparative paucity of bird-life in the zones below. The song of the Superb Redbreast is heard on all sides, Sardinian and Spectacled Warblers creep about the bushes, and Chiffchaffs simply swarm everywhere. Blue Titmice come down from their true home in the zone above, while Blackbirds and the ever-present Canaries add their notes to the melody. The most luxuriant vegetation of the Monte Verde is to be found in the deep cool *barrancos*, which are transformed from dry "nullahs" where they pass through the Coastal Belt, to wonderfully verdant ravines, the dripping walls festooned with ferns, lichens, liver-worts, ivy, mosses, and creepers; the higher slopes, where the walls are not too precipitous, being thickly overgrown with a tangle of heaths and evergreen shrubs. One of the most beautiful ravines in the whole island, where the vegetation of the "Monte Verde" is developed to an exceptional extent, is the renowned Barranco del Rio, lying next to the Barranco Badajos, from which it is separated by a high verdant-covered ridge. To reach the northern side of this *barranco* from Guimar, one climbs the steep path from the village, ascending through cultivated lands—terrace upon terrace of bearded-wheat—to a height of 2700 feet. At 2050 feet the outskirts of the Monte Verde commences, and the first white-flowered *Cistus monspeliensis* is met with, a small shrub, which, together with the sweet-smelling Escobón (*Cytisus prolifer*), the latter covered in late April with broom-like yellow

flowers, forms, with the rarer *Cistus vaginatus* and *Adenocarpus foliolosus*, the main vegetation, carpeting the more open hill-side from 2500 feet and upwards. At 2700 feet one must follow the *açequia*, a narrow stone-built channel which conveys the water along the side of the Barranco del Rio to Guimar, from rock borings far above. It is at this elevation that the Monte Verde proper is entered. The *açequia* winds round the hill-side and then runs along both sides of the Barranco del Rio at a considerable height from the bed of the ravine, which becomes narrower and more luxuriant as the head of the gorge is neared. The vegetation is so thick that unless I had visited the spot personally I would never have believed it possible to discover such a place anywhere in the Canary Islands. As far as the eye can reach the sides of the *barranco* and the hills beyond are clothed with a tangle of tree-heath (*Erica arborea*), small holly (*Ilex canariensis*), and the broad-leaved, white-flowered *Viburnum rugosum*; the undergrowth is varied in the extreme, the white-flowered *Cistus monspeliensis* and the taller mauve-flowered *Cistus vaginatus* predominating. Beneath the shade of the white *Cistus* the remarkable yellow and red *Cytinus Hypocistis* was found growing, while the common purple *Echium plantagineum* and the much scarcer tall magenta-coloured *Cynoglossum pictum* added colour to the sea of green. *Daphne gnidium* was fairly common above 2900 feet.

Spread over the whole of the southern side of the *barranco*, to which it is apparently confined, as I did not see a single example on the northern side of the ravine, is the fine indigenous tree (*Arbutus canariensis*) described by Dr Salter in his scientific account of the vegetation of the Barranco del Rio. There must be several hundred of these trees, and their bright

cinnamon-brown smooth trunks and branches are very conspicuous, especially viewed from the opposite side of the gorge, when their numbers can be fairly accurately estimated. I followed the narrow *acequia* to the head of the *barranco*, in places a highly dangerous walk, not to be attempted by anyone who is not blessed with a steady head. The *acequia* winds round the cliff, which latter in places overhangs it, obliging one to walk below on slippery rocks protruding barely the width of one's boots from the walls, and with a "drop" of several hundred feet into the gorge below. By clinging on to the edge of the low aqueduct with one's hands, the worst places can be successfully passed, but the writer eventually had to crawl on hands and knees along the *acequia* ledge with his toes in the ice-cold water—a slow mode of progression which is not to be recommended. However, once safely at the end of the *barranco*, the wonderful vegetation well repays one for the "crawl." The rock-faces are, in the month of April, festooned with the beautiful purple *Senecio Heritieri*. Forget-me-nots (*Myosotis*) grow in profusion in the more sheltered moist spots, and the dripping walls are a mass of ferns, maidenhair, and *Woodwarsia radicans*, climbing plants such as *Vicia cirrhosa*, and the Canarian ivy trailing over everything. The water here comes splashing down from the heights above, and the *acequia* crosses the head of the ravine by a small bridge constructed for that purpose. A short climb up the opposite cliff, and the return journey is made along the southern side of the *barranco* on a path sufficiently good for mules, through the same—almost impenetrable—vegetation, including the rare *Arbutus canariensis* trees, which can now be examined at close quarters; the red stems are as smooth to the touch as polished wood, the average size

of the trunk is from 37 to 50 inches in circumference at 3 feet from the ground; but one particularly magnificent giant actually measured 140 inches round the trunk at 2 feet from the ground, a very exceptional measurement. From the branches hung clusters of pale, rose-coloured flowers, but the fruit was not then in season.

Though birds are numerous in the depths of the Monte Verde, and especially so in such places as the Barranco del Rio, yet owing to the thick vegetation they are not often seen; Redbreasts, Blackbirds, Blue Tits, Chiffchaffs, and Sardinian Warblers are the species usually met with in the undergrowth, while overhead Pallid Swifts scream and chase one another, nesting in the most inaccessible walls of the *barranco*. It is in the Barranco del Rio that the Monte Verde is to be seen at its richest.

As the upper limits of the Monte Verde are reached, we pass almost imperceptibly into the second of the great belts of the Cloud Region—the Zone of the Pine Forests, which, a few centuries ago, must have covered a continuous stretch of country, clothing the ridges from Esperanza southwards without a single break. At the present day, the broken belt descends in isolated patches as low down as 3300 feet, but, for the most part, it is to the higher ridges that one has to ascend before the forest can be seen at its best. Wherever the Pine Belt has been destroyed, the heaths of the Monte Verde extend their range upwards, and when the pines descend to an unusually low altitude, as they do above Guimar to 3300 feet, the trees grow amongst a tangle of tree-heath, faya, and holly, which gradually thins out as the higher latitudes are reached. There is still a certain amount of pine forest remaining on the Anaga promontory, although not visible from

the north-west; while on the southern side of the Laguna plateau the Pinar commences again on the ridges just beyond Esperanza, and is clearly visible from Santa Cruz. From this point southwards, the hills are for the most part fringed with pines, some particularly good patches lying above Barranco Hondo, Araújo, Guimar, and Escobonal. The thickest forest of all, where the pines attain their finest growth, is to be found above Vilaflor—the highest village in the island. Unfortunately, wide stretches of country appear in the Pine Zone absolutely devoid of trees, or else a mere handful of pines remain to mark the spot which in happier days was a flourishing forest. It is no uncommon sight to meet with two or three gaunt isolated pines standing lone upon the hill-side, forlorn testimony to the short-sighted policy pursued by the improvident Spaniard, who even now refuses to assist in the re-afforestation of the land. Everywhere famished goats are encouraged to roam the hills, falling ravenously upon the young pines the moment they shoot through the earth. Absolutely no protection is afforded to the seedlings, and as with the Pinar of Gran Canaria, so with the forests of Tenerife—the *Pinus canariensis* is doomed to destruction, unless very different methods are employed in the future for its preservation from those practised in the past. The Pinar in Tenerife is principally confined to the high ridges lying on the south-eastern and south-western flanks of the central backbone. On the northern slopes the pines are almost absent save for good patches of forest above Icod and La Guancha—the “Pinar” usually visited by those whose headquarters are at Orotava.

It was in the Pine Belt that in former days the Juniper (*Juniperus oxycedrus*)—now practically exterminated in Tenerife owing to the value placed on its

timber—used to flourish. A few scattered examples may still be seen, notably clinging to the wild rock faces above Vilaflor. In the juniper the Canary Islands possess a similar tree to that found in the Atlas Mountains, forming another link between the flora of that great range and the islands of the Canary Archipelago. According to some authorities, the juniper still exists in the island of Palma at an altitude of 4000 feet, while presumably the Pico del Cedro, 7470 feet above the sea, is so called from the fact that the juniper once grew upon its summit.

The birds of the Pine Zone are second to none in point of interest, for it is here that three of the rarest birds in the island are to be sought—the Teydean Blue Chaffinch, the Tenerifean Great Spotted Woodpecker, and the Tenerifean Goldcrest. These are all typical species of the Pinar, but are not by any means plentiful. In the thickest stretch of pine forest on the Guimar side of the Pedro Gil divide, one pair of Blue Chaffinches was seen, while the Woodpecker was never met with there, and I saw no trace of its nesting holes on the trees. Goldcrests were, however, more plentiful, though not by any means numerous. The Blue Chaffinch and the Woodpecker are less rare in the forests on the southern slopes of the island, but I fear the former have decreased in numbers since Meade-Waldo wrote of it in 1893 that "it appears to hold its own in all the pine forests of Tenerife." Owing to the reputation for rarity which it has now unfortunately gained, every gun is levelled at it, and as it is one of the tamest birds imaginable, it is not surprising that its numbers have not increased. I would urgently implore future ornithologists or collectors to be very sparing when in search of this most beautiful of all

the Chaffinches, and to remember that once the bird is exterminated—as it may only too easily be—one of the most interesting of insular species will for ever be lost to the ornithological world. The same applies with even greater force to the Gran Canarian Blue Chaffinch, an even rarer sub-species than the Tenerifean bird, but having this much in its favour—the great scarcity in the pine woods of Gran Canaria of the Sparrow-hawk, which preys mercilessly on the Blue Chaffinch in Tenerife, and the greater inaccessibility of the pine forests.

In another chapter I have dealt more fully with the Great Spotted Woodpeckers of the Pine Belt (their bright colouring marks them as the most conspicuous and quite one of the most attractive of all Canarian birds), unfortunately so seldom seen by the average visitor to the Islands. Of other denizens of the pine forest the most plentiful is doubtless the Chiffchaff, found in practically the same numbers in every zone of the island. Another species equally at home amongst the pines is the Tenerifean Blue Titmouse, consorting with the Chiffchaffs and Goldcrests. Dr Salter places the perpendicular range of the pine forest in Tenerife at from 4000 to 6000 feet, but this, of course, must not be taken as an exact estimate. As already noted, the patches of pines descend above Guimar to 3300 feet, and in the north of the island the pine-clad ridges are even lower. In the same way some fine stretches of forest may still be found above 6000 feet, but on the whole Dr Salter's estimate is very sound.

The third sub-zone of the "Cloud Region" is that of the two fodder-plants—the Escobón (*Cytisus prolifer*), silver-leaved and covered in spring with white blossoms (see accompanying illustration), and the Codéso (*Adenocarpus viscosus*), a dark green shrub covered with golden-



Desert Vegetation on the Montañeta de Guimar Lava Flow



Escobón (*Cytisus prolifer*), silver-leaved and



F (*Euphorbia*, *Plocama*, *Launea*, etc.), Maritime Zone.



ce-flowered, by Volcano of Aráfo, 5150 feet.

yellow flowers very similar to the gorse. The former is more characteristic of this sub-zone than the latter, for whereas I have never seen the Escobón below the pines, the Codéso is far from uncommon in the Monte Verde, growing in company with the white-flowered *Cistus*. The lower illustration facing page 98 shows the Escobón and Codéso above the Aráfo Volcano, and was taken at a height of 5150 feet. The rose-flowered *Cistus vaginatus* was growing plentifully at this elevation, but was not found above; it is rather a flower of the Monte Verde Zone. Many hundreds of acres in Tenerife are covered with the two fodder-plants, the natives living in the villages along the north-western slopes making long journeys to obtain sufficient for their needs. There seem to be no restrictions as to the amount which can be cut, and in the evening whole families—men, women, and children—wend their way down the steep, exceedingly bad, mountain-paths, carrying huge bundles on their heads. As often as not a donkey laden with four or five huge, well-stuffed sacks of Escobón, accompanies the family party, and I have met with little girls of eight years of age balancing monster sacks on their heads which it made my arm ache to carry 500 yards! They must have climbed at least 4000 feet above their village to get it, making the upward journey in the blazing sun and returning in the cool of the evening. Birds are not common once the pines are left behind; in fact the only species which I have noted anything like regularly in the fodder-plant zone is the Blue Tit and Berthelot's Pipit, the latter equally at home from sea-level to the Cañadas.

We now pass to the third great region which we term "Above the Clouds," lying between 6500 feet and the summit of the "Peak." The characteristic shrub above 6450 feet, where it was first noted at Pedro Gil, is

the Retáma (*Spartocytisus nubigenus*), a dark-green leafless broom which covers the lava-strewn mountain-sides and the pumice-covered Cañadas, and grows on the slopes of the Peak to an elevation of 11,000 feet. In the Cañadas birds are rare. Berthelot's Pipit, however, is found breeding there up to 7000 feet, and the Grey Shrike again appears and is found up to the same elevation, where it is not uncommon. The Swifts seen in the Cañadas are the little Black Swift (*Cypselus unicolor unicolor*) and not the Pallid Swift, which is an inhabitant of the lower *barrancos* and coastal region generally. The Black Swift has been recorded flying round the summit of the Peak itself—taking no notice of the sulphurous fumes which were issuing at the time from the vent of the crater.

As Dr Salter notes, there is really no soil to support an Alpine flora in Tenerife, the only species which serves to remind one of the Alps being *Arabis albida*, a perennial herb characteristic of the high altitudes, which is mentioned by all who have written about this region. Towards the upper limits of the Llano de la Retáma—a name sometimes given to the pumice-stone plains at the base of the Peak—an endemic violet (*Viola cheiranthifolia*) is found. Above this level the only vegetation on record is a moss (*Griminia apocarpa*) which Dr Salter found at 11,713 feet, maintained, as he tells us, by condensation of moisture from a volcanic vent, while at 11,903 feet in the crater itself, a black crustaceous lichen was discovered—doubtless the same mentioned by Johnson (*Encycl. Brit.*, 9th ed., iv., p. 797). From November until May the Peak is usually covered with snow, and on a clear day, when the clouds formed by the Trade-winds have dissipated, it affords a magnificent sight. Owing to the Cloud Belt, the best view of the Peak

is undoubtedly obtained from steamers out at sea, and the finest view I have ever had of it was from San Sebastian in the neighbouring island of Gomera. In Tenerife itself the Peak is unfortunately hidden by the Cumbres from anyone staying at Santa Cruz, but when the weather is favourable a wonderful view of it can be obtained from just above Tacoronte on the main road to Orotava.

There remain three more islands in the Western Canaries—Palma, Gomera, and Hierro—and of these the writer has only visited Gomera. Some account of the birds and vegetation of this island is given in Chapter XI. It is famous for the magnificent growth of tree-heath (*Erica arborea*) which clothes the upper slopes above 1600 feet. Gomera is a small island $15\frac{3}{4}$ miles from north to south, 13 miles from east to west, covering an area of 172 square miles, and, like Gran Canaria, is almost round in shape. Its shores are very steep, and entrance to the interior of the island can only be gained by following one of the numerous *barrancos* which cut up the coast-line. The largest valleys are closely cultivated, and as there is plenty of water, vegetation is greener and more luxuriant than in Tenerife. The cultivation of the banana is on the increase, wheat is extensively grown. Notwithstanding these conditions, bird-life, particularly in the valleys, is remarkably scarce at the present day. In the cultivated area below 1500 feet, such species as the Raven, Goldfinch, Canary, Rock-sparrow, Berthelot's Pipit, Blue Titmouse, Blackcap, Chiffchaff, Spectacled Warbler, Blackbird, Hoopoe, Buzzard, Kestrel, Egyptian Vulture, Rock Pigeon, and Barbary Partridge may be seen, but with few exceptions, such as the Raven, Wagtail, Chiffchaff, Kestrel and Partridge, the species enumerated are only met with in very small

numbers. In the tree-heaths we find such birds as the Pale Robin—a very different race from that found in Tenerife and Gran Canaria, and the Tenerifean Goldcrest, while on the high ground there are two fine laurel pigeons (*Columba bollei* and *C. junonice*) and the Woodcock is a breeding bird. Despite the visits of Meade-Waldo, Polatzek, and the writer, to Gomera, much ornithological work still remains to be done before we shall be able to write of the birds of that island as we can to-day of the birds of Tenerife and Gran Canaria. The same remark applies to Hierro, one of the two islands which I have not explored personally, and to a lesser extent to the island of Palma. I shall not attempt to give an account of Hierro; the birds found thereon are given in Appendix B, while the Zones of Vegetation have never been worked out. In comparison with the other Western islands, Hierro is said to be a desolate island surrounded with perpendicular precipices; the shores are indeed so steep that there is no coastal town. Meade-Waldo likened the middle of the island to a high down-like tableland; only part of the high ground is forested with pines and there is a certain amount of tree-heath and scrub, but to a much lesser extent than in Gomera. The highest point—the Alto del Malpaso—attains 4990 feet. Unlike Gomera, Hierro is a waterless island, and in consequence cultivation is restricted. Vines, however, grow well on the north-western coast in the neighbourhood of El Golfo, a valley very similar in formation to the valley of Orotava in Tenerife but on a much smaller scale, the mountains rising much nearer to the coast.

The birds of Hierro are much the same as those found in Gomera, but there is no Partridge and no Woodcock. The Titmouse and the Chaffinch are races

restricted to Hierro, and are therefore of special interest to the ornithologist. The Pale Redbreast is the same as that found in Gomera and Palma, and the Goldcrest also occurs in the Pinar, tree-heath, and laurel wood. Neither of the Canarian Laurel Pigeons inhabit Hierro, the genus being represented only by the Canarian Rock-pigeon (*Columba livia canariensis*).

The island of Palma, famous for its immense crater—over four miles in diameter and 5000 to 6000 feet deep—is the only remaining island of the Western Group left to mention. It is a large, mountainous, pear-shaped island, 29 miles in length, $17\frac{1}{4}$ miles at the broadest part, and covers an area of 318 square miles. Deforestation has taken place there much less than in Tenerife, and the *Pinus canariensis* covers a large extent of country. Accounts of the vegetation of Palma are scarce—the most recent paper, by T. A. Sprague and J. A. Hutchinson, appeared in the *Kew Bulletin*, 1913, part viii., pp. 287-299. These botanists visited the island in May and June 1913. From their account we gather that cultivation takes place mainly between 1000 and 2000 feet, the principal crops being onions, vines, maize, and wheat, while mulberry and fig-trees are numerous. The woods of the lower slopes of the Cloud Belt appear to consist mainly of typical laurel, *Myrica faya*, *Erica arborea*, and *Ilex canariensis*, with undergrowth of *Cistus* and bracken, reaching its fullest development between 3000 and 4000 feet. At 4700 feet the vegetation consists mainly of pines, tree-heaths, and bracken; above this altitude the upper ridges are clothed with pine woods practically destitute of small vegetation. The highest ridge reaches an altitude of 7690 feet, culminating in the Pico de Muchachos, above the Gran Caldera, but the greater part of the central backbone of the island varies between 4750 and 6500 feet.

Those who have visited Palma as well as the other islands of the Archipelago are of opinion that it is the most beautiful of all. I was unfortunately prevented from landing there owing to the island being placed in quarantine, although I made a special expedition from England in 1920, with the fixed intention of completing our knowledge of the Ornis of that island. Many species of birds are found in Palma, all of which will be found enumerated in the list at the end of this book. The island is remarkable as being the only one in the entire Archipelago where the Chough is found—and there it is exceedingly plentiful. Palma has its own peculiar Chaffinch and Titmouse, both with white breasts, while another interesting bird is Heineken's Blackcap—an aberrant form of the Dusky Canarian Blackcap. Both the fine Canarian Laurel Pigeons inhabit the island, and there is no doubt that although no "new birds" remain to be discovered there, Palma should be visited by an ornithologist, who has a knowledge of Canarian ornithology, with a view to working out the faunal zones and studying the *habits* of the birds. Indeed, it is to this I would advise any ornithologist finding himself in the Canaries to turn his attention. Fine series of the birds of the Canary Islands have now been obtained from all the islands of the Archipelago, and may be seen in the Bird Room of the British Museum (Natural History), so that further collections are not required.

CHAPTER V

SOME OPINIONS ON THE AFFINITIES AND ORIGIN OF THE
CANARIAN FLORA, AND THE MODES OF DISPERSAL OF
THE TREES AND PLANTS.

ACCORDING to the latest authorities, Messrs Pitard and Proust,¹ the affinities of the Canarian endemic flora fall into four groups and are clearly set forth as follows :—

- I. *Mediterranean Region*, used in the largest sense, that is to say, from Spain to Persia, and from Tangier to Alexandria.
- II. *African Region*, east (Abyssinia, Socotra, Nubia, Egypt), and South (Cape of Good Hope, Natal, Madagascar, and the neighbouring islands).
- III. *Asiatic Region* (India to Japan).
- IV. *American Region*.

By far the greatest number of species, peculiar to the Canary Islands, which we meet with, come into the first section and have their affinities in North Africa or Southern Europe, and the islands of the Mediterranean Sea, and represent about 107 different genera. A good example of this is a fern (*Adiantum reniforme*) at present extinct in Europe, but known in the Pliocene

¹ Authors of *Les Iles Canaries, Flore de l'Archipel*, a work dealing with the flora of the entire Archipelago, published in 1908.

of Portugal, and which continues to live at the present day in the Canaries. Guppy reminds us that the proximity of the Great Atlas mountains to the Canaries must not be overlooked when we are considering the sources from which these islands have derived their flora. In the Canarian forest flora we have, he points out, in *Daphne Gnidium*, a European species that is associated on the slopes of the Great Atlas with *Daphne Laureola*; and again that the Canarian flora owns in *Juniperus Oxycedrus*, a Great Atlas tree. "Not more than 250 miles separate the western extreme of the Atlas Mountains from the Canary Islands," and, as Guppy truly remarks, "it would be strange if the woods of that Archipelago had not received important accessions from that elevated region."

Another large group of plants, representing roughly forty genera, have their nearest neighbours in East or in South Africa, but hardly any endemic Canarian forms are represented in tropical West Africa. Eight genera have their nearest allied forms in Eastern Asia, while most remarkable of all we find no less than twelve genera having American affinities, closely allied or even similar forms being found in America, Mexico, or the Antilles. A striking example of this is the beautiful fern *Woodwardsia radicans*, Sw., which is so familiar in the damper spots of the Canary Islands and grows equally well in the forests of the Antilles. In this connection it is interesting to recall what Sir Charles Lyell published more than fifty years ago. Dealing with this very subject he wrote: "A botanist, wholly ignorant of the plants which lived on the Continent of Europe in Miocene times when the first volcanoes were beginning their eruptions in the Canaries, Madeiras, and Azores, would be in no small degree perplexed at the presence in these Archipelagoes of such Atlantic

types as *Clethra* and *Persea*,¹ of which living representatives exist in no part of the world nearer than the continent of North America. It would seem to be a violation of the general law according to which the organic production of islands bear most resemblance to those of the nearest continent. But fortunately the labours of Unger, Heer, and Göppert on the fossil botany of the Tertiary strata have shown us that Europe, when the Atlantic volcanoes first reared their crests above the waves, was covered with an exceedingly rich vegetation."

Regarded as relics of a Miocene flora, Lyell considered the American forms *Clethra* and *Persea* just such as we should naturally expect to have come from the adjoining Miocene continent. Guppy has turned his attention to the same question, and includes in the American elements of the Canarian flora the tree above mentioned—*Clethra arborea*—and also the shrubs *Cedronella* and *Eystropogon*, and certain species of the genus *Bowlesia* which are most typical of the South American flora. The botanists, Hooker and Christ, both explain this by the transatlantic carriage of the seeds of the parent plants. Guppy, however, tells us that no evidence is produced of the fitness of these plant genera for distribution by currents, and points to the fact that *Clethra* and *Cedronella* exist in Eastern Asia. To reconstruct satisfactorily the past of the Archipelago, we must study the affinities of the endemic types, and according to Sauer, who wrote in 1880, out of a total of 1250 Canarian plants, 333 came

¹ Pitard and Proust tell us that *Persea indica*, the form found in the Canaries, Madeira, and Azores, closely resembles the numerous species of the same genus which grow in Asia, but agree that *Clethra arborea* is most nearly allied to the American types of this genus. Sad to say, *C. arborea* has now disappeared from the only locality in Tenerife from which it has ever been recorded. It is still, I believe, found in Madeira.

under this heading. This, we have seen, proves that the Canaries are largely "peopled," as far as their flora is concerned, from the Mediterranean region, thus coinciding closely with ornithological deductions—the avifauna of the Archipelago, as is shown in another chapter, being undoubtedly European in origin.

It has been remarked elsewhere that the student of botany will find a great deal to occupy him in the Canaries, not least being problems relating to the dispersal of plants in the various islands, and the means by which such dispersal has taken place.

The affinities of the Canarian flora have already been touched upon, and it has been pointed out that the first aim of the botanist, when studying the distribution of plant-life, must be to eliminate all but the truly endemic flora, a wide knowledge being necessary to distinguish between the old indigenous species and the many forms which have been introduced through the agency of man.

The two great agents in carrying seeds from one place to another are undoubtedly birds and currents, and this subject is very fully entered into by H. B. Guppy in his fascinating work, *Plants, Seeds, and Currents in the West Indies and Azores*, a book of which I have very freely made use.

Dealing with this very question, of which he has made a special study, Guppy wrote: "The restrictions of most of the characteristic plants of the woods to the Macaronesian Islands (the Azores, Canaries, and Madeira), the extension of nearly all those of the upland moors to Europe, and the common dispersion on both sides of the Atlantic of the plants of the seashore and of the ponds and lakes, illustrate a principle of wide application to insular floras—a principle, however, that is often best exemplified in tropical regions. The

varying degrees of isolation thus implied reflect . . . the differences in the histories of the dispersing agencies in stocking with their plants the woods, the moors, the ponds and lakes, and the sea-shores. The currents have been for ages unceasingly at work directly and indirectly, in carrying seeds from one coast to another; and as a rule in tropical latitudes the specific connections kept up between the shore floras of different regions can be mainly ascribed to their influence. In a similar manner migrant waterfowl have sustained the connections of the plants of the river, the lake and the pond, over great areas of the globe. In a like fashion, though to a less extent, birds of the Grouse family have kept the plants of the mountain moors of distant regions in touch with each other. On the other hand, the dispersing activities of forest-frequenting birds, as far as oceanic islands are concerned, have been more and more restricted in the course of ages. The bird family comes to stay, and both plant and bird differentiate together."

The degree of isolation which an island enjoys—that is to say, its distance from, or proximity to, a continent—is obviously a very important influence to be considered. Comparing the Azores with the Canaries in this connection, Guppy observed that antiquity alone may largely counteract the effects of contiguity to a continent. He remarked that the Canaries were evidently of much greater age than the Azores, and pointed out that to this circumstance we might attribute the fact that as many as 30 per cent. of their native plants are peculiar, whilst only 10 per cent. are endemic in the Azores. This is instructive when we consider that only fifty-seven miles of open sea separate the Canaries from the African coast, whilst about eight hundred miles intervene between the Azores and the nearest mainland—the coast of Portugal; it is therefore

apparent that it is not so much the distance from a continent which affects the endemic flora of an island, as the antiquity of the island itself. It is strikingly shown in Guppy's volume that the Canaries hold the wrecks of many flora (*loc. cit.*, p. 413).

The waves of African, Asiatic, and American plants that in successive ages passed over this portion of the globe, left their wash on the Canarian and Madeiran groups before the Azorean Islands became available for plant-stocking. It is abundantly evident from the mass of information we now have, that the parent stocks, from which the flora of the Canaries was originally derived, were driven from their European home. The characteristic tree, *Laurus canariensis*, which is now confined to the Canaries, Madeira, and the Azores, but which grew in South Europe in Upper Tertiary times, has been cited as an instance of the great revolution which the vegetation of Europe has undergone "within the life-time of species that now so forcibly arrest our attention in the forests of the Canaries, Madeira, and the Azores."

Mention must here be made of the Dragon-trees (*Dracæna Draco*) which survive in the Islands, and indeed tourists to Tenerife usually pay a special visit to Laguna in order to see a very ancient specimen of the Dragon-tree which is to be found there. The age to which this remarkable tree attains has been the subject of much discussion. Various extravagant estimates have been made, all more or less based on the opinion of celebrated botanists of their time. For instance, it has been said that the wonderful Dragon-tree of Orotava which perished¹ through insufficient pre-

¹ References to this tree and its destruction: *vide* Lebas in *Revue Horticole*, 1868, p. 134; Fenzi in *Gardeners' Chronicle and Agricultural Gazette*, 11th January 1868, p. 30; Lindley and Moore's *Treasury of Botany*.

cautions being taken to preserve it, in a hurricane in 1867, was 6000 years old; and again, we read (Lindley and Moore's *Treasury of Botany*): "The famous Dragon-tree of Orotava was a giant amongst the plants of this type of vegetation—with an antiquity that must at least be greater than that of the pyramids" (!) Such remarks as this, made in all good faith in those days, cannot be taken as approaching accuracy with the present state of our knowledge. Unfortunately we often see Humboldt's estimate of the age of this and other trees of like species in the Canaries quoted at length.

It is unlikely that any of these estimates of very great age are correct. The rate of growth cannot be assumed to have been uniform throughout the life of the tree, and was doubtless much more rapid in earlier life. It stands to reason that the rapid growth of the young cannot be continued indefinitely. An extravagant estimate may have been arrived at by calculating the rate of growth of ancient trees living at the time the estimate was formed, and without taking into consideration the fact that the rate of growth had already greatly diminished in the specimens under observation on account of their advanced age. It may, however, be safely asserted that certain of the Dragon-trees in the Canary Islands do attain a prodigious age, although the means hitherto employed to estimate the number of years they continue to thrive can no longer be considered a safe guide.

A more reasonable age of the Orotava tree is furnished by Lindley (*The Vegetable Kingdom*, 1853), where he notes that the famous Dragon-tree of Orotava was an object of great antiquity in 1402 A.D., and was still alive in 1853. Four hundred or perhaps five hundred years does not appear to be an impossible age for such

a tree to have reached, although we are not told how this estimate was arrived at. Fenzi,¹ who examined this tree just prior to its destruction, notes that it was 78 feet in circumference and not more than 75 feet in height.

Fine specimens of *D. Draco* may be seen at the present day at Garachico, Laguna, Realejo, and Icod, all in Tenerife; the tree at Icod is said by Dr Salter² to be 12 $\frac{1}{4}$ m. (i.e., 40 feet 2 $\frac{3}{4}$ inches) in circumference, at 3 m. (9 feet 10 inches) from the ground, and is now the largest specimen in the island.

The accompanying illustration shows a small specimen of this tree in the garden of the hotel Pino de Oro in Santa Cruz, but compared with the giants already cited is a very young example indeed. The Dragon-trees are examples of the oldest constituents of the Canarian flora which were derived in the first instance from Africa before the invasion of Asiatic plants took place. *Dracena Draco* is confined to the Canaries, Madeira, and the Cape Verde Islands, but is said to be nearly or quite extinct on the last two. There are few places in Tenerife, or indeed in any of the Islands where the Dragon-tree can be seen growing wild in its natural position. However, in Tenerife at any rate, there are one or two such spots: Dr Salter found it above Guimar "clinging to the uppermost rocks near the skyline at the head of the Barranco de Badajos," of which a photo plate is reproduced in *Manchester Memoirs*, vol. lxii., No. 8, Pl. I, and it is to be found growing wild on the Taganana coast, near the north-east extremity of the island. The situations in which Guppy found it suggested to him the dispersal of its seeds by birds; he remarked that he once came across it "in the broken-down caverns of an old lava-flow frequented by

¹ Cf. footnote on p. 110.

² *Proc. Manchester, Lit. and Phil. Soc.*, 1918, p. 8.



The Dragon-tree in the Garden of the Pino de Oro Hotel, Santa Cruz.

[To face page 112]

pigeons that doubtless brought the seeds." The pigeons referred to here could hardly be any other than the Rock-pigeon (*Columba livia canariensis*), although he does not identify them in his text. Sir Joseph Hooker suggested that as the nearest ally of the Canarian Dragon-tree is at the present day confined to Abyssinia, Southern Arabia, and the island of Socotra, it is descended from a Dragon-tree, which at a very remote period may have flourished in North-West Africa, and which has since become extinct, an explanation which seems quite probable. As the seeds of *Dracenas* are shown to be well fitted for withstanding transport in a bird's stomach, its introduction into the African islands, through the agency of pigeons or other seed-eating birds, would then have been a simple matter.

I have noted more than once in these pages the remarkable flora of the Coastal or African Belt in the Canaries. The modes of dispersal of these plants have always interested me intensely, and it was with considerable pleasure that I read Guppy's all too short note on "The Strand Plants of Tenerife and of the North-East Corner of Grand Canary." As the north-east corner of Gran Canaria is within easy walking distance of Las Palmas, it may be useful to give here a short resumé of Guppy's investigations in this particular district.

The locality in which the strand flora was found to be most developed was on the west side of the Isthmus of Guanarteme, which connects the north-east corner of Gran Canaria with the Isleta. The commonest *Euphorbia* here was *E. Paralias*, which covered the sand-dunes near the shore. Other plants enumerated from this part of the coast were *Atriplex portulacoides*, *Frankenia*, *Heliotropium*, the two curious ice plants, *Mesembryanthemum crystallinum* and *M. nodiflorum*, and a *Zygophyllum*, the last named growing "along

the upper drift line where the beach was shingly, and on the rocks bordering the beach at La Isleta." The modes of dispersal of some of these plants is discussed, and the conclusion arrived at that we cannot exclude human agency in the case of the two species of *Mesembryanthemum*, which were extensively cultivated in the group in the eighteenth century (see Samler Brown's *Guide to the Canary Islands*, 1913 [d], p. 9).

The question of the dispersal of the carpels of *Crithmum maritimum* across the sea by currents, and locally by the winds, is entered into in "Plant Dispersal," where it is remarked that they are very buoyant and can float for several months in sea-water. As they are so light a strong wind blows them along the beach and up the face of the cliffs. Guppy also experimented on the fruits of a species of *Zygophyllum* which was obtained on the Guanarteme Isthmus. This was probably *Z. fontanesii*, which is found both in the Cape Verde Islands and on the Atlantic coast of Morocco. It was ascertained that this species had a limited capacity for dispersal by currents, but could accomplish a sea-passage of from 100 to 200 miles, which would be sufficient for its journey from the African coast to the Canary Islands. The seeds of *Beta maritima*, on the other hand, cannot accomplish a sea voyage of any length, since the buoyancy of the fruit is limited to a day or two; they cannot, therefore, have been transported to the Canaries in this way. Here, then, are a few direct examples of the part played by currents in stocking the Canary Islands with plants.

The seeds of *Frankenia* are, on the other hand, most probably distributed by birds. When we remember that the Islands are visited annually by 54 regular migratory birds (which includes the five partial residents), in addition to which 30 occasional visitors are recorded,

besides 72 rare stragglers (a remarkable list of 156 species¹ in all), we can form some idea of the great part which these seed "carriers" must have played in the dispersal of plants in the Archipelago. Many of the migrants here alluded to have a very extensive range, and a considerable number of the birds now inhabiting the Canaries, or which pass through on migration, belong to fruit-eating species.

Wading birds are well represented among the occasional and regular visitors—Turnstones, Kentish Plovers, Ringed Plovers, Godwits, Whimbrels, Common Sandpipers, and Grey Plovers, to name only a few, figuring in the lists—all birds which have a wide distribution and visit the Archipelago on their way to and from distant parts of the earth. This is the class of bird which transports seeds many thousands of miles, the seeds adhering to the mud which often sticks to the feet and tarsi of the shore- and marsh-frequenting species. Birds, of course, often carry plants from one place to another by swallowing the fruit and ejecting the seeds in a state still fit for germination, or else by the seeds becoming attached to the feathers of ground-frequenting species, such as the Woodcock and Quail.

Guppy regards the connection between the plants of the woods of the Azores, and those of Europe, as either broken or breaking, but proves that the connection has been kept up between the Azores and Madeira and the Canaries. This he attributes to the activities in recent times of frugivorous birds, an exceedingly interesting conclusion if correct, as it points to the inter-communication of fruit-eating species between the Azores and the Canaries. Attention has been drawn to the fact that

¹ The Islands are tenanted by sixty-one resident birds in addition, many of which may, in one way or another, have transported seeds, when they themselves first gained a footing in the Islands, or before the migratory habit was lost.

many of the plants of the woods in the Atlantic Islands show specific and varietal differentiation, and that this divergence corresponds with the specific and sub-specific differentiation of the pigeons of the genus *Columba* inhabiting these islands.

It may be opportune here to review the members of the genus *Columba* found in the three groups of islands referred to, as it shows what marked differentiation has taken place amongst them.

In the first place the Canary Islands possess three distinct members of the genus :—

1. *Columba bollei* Godman ; inhabiting the islands of Tenerife, Gomera ; and Palma, formerly in Gran Canaria ; also
2. *Columba junoniae* Hartert ; inhabiting the islands of Gomera and Palma.
3. *Columba livia canariensis* Bannerman ; inhabiting all the islands of the Archipelago.

The first two frequent the laurel woods. Meade-Waldo remarks that *C. junoniae* feeds largely on the fruit of the til-tree (*Ocotea* [*Oreodaphne*] *fætens*) ; while both *C. bollei* and *C. junoniae* feed on the fruit of *Persea* [*Laurus*] *indica*. Bolle's pigeon died out in Gran Canaria with the destruction of the last laurel forests.

The third species mentioned (*C. l. canariensis*) is a perfectly distinct race of the common Rock-dove, which I separated and named in the *Ibis*, 1914, p. 270. As a seed and grain eater it must be given a very high place.

The next island, Madeira, can claim only two pigeons, one of which, however, is a very distinct species :—

1. *Columba trocaz* Heineken ; confined to Madeira, where it lives in the high laurel forests, frequenting the til-trees (*Oreodaphne fætens*).

2. *Columba livia* var. : for which I only use binomials as it is not a typical bird, but is probably descended from a domestic race. Specimens of this Rock-dove from Madeira show considerable variety *inter se*.

Lastly, we have the Azores, and here we find two resident pigeons :—

1. *Columba palumbus azorica* Hartert ; inhabiting the eastern and central groups of islands. It is not known from Flores or Corvo (Western Group).
2. *Columba livia* var. : probably found in all islands. Another curious aberrant type, but not yet separated as distinct. Most likely descended from, or closely interbred with, domestic pigeons.

The Azorean Ring-necked Pigeon (*C. p. azorica*) frequents, according to Ogilvie-Grant,¹ the small woods and clumps of heath-trees (? *Erica arborea*) and juniper (*Juniperus oxycedrus*, var. *brevifolia*) as well as the dense patches of faya (*Myrica faya*) and pine.² They were found feeding largely on the roots of the yellow Oxalis.

In the three groups of islands we have no less than—

Three perfectly distinct species.

Two well-defined subspecies (a Rock-pigeon and a Ring-dove).

Two aberrant forms of the Rock-pigeon.

Taking into consideration the enormous seed-eating propensities of these birds, they may certainly be

¹ *Novitates Zoologicae*, vol. xii., 1905.

It is of interest to note that Guppy (*loc. cit.*, p. 410) remarks : "The absence of the pine from Pico and from the Azores as a group is a very pregnant fact in the history of the plant-stocking of the Archipelago."

credited with having contributed largely in bygone days to the dispersal of trees and plants of the woods in the islands under discussion.

It is certain that the migrations of the true wood pigeons, as far as the Azores, Canaries, and Madeira are concerned, have now ceased, and both the pigeons and the plants which they dispersed have become differentiated through isolation and other causes which we have discussed elsewhere.

Pigeons are not by any means the only species which have doubtless played an important part in the distribution of seeds in the Canaries. Guppy holds that many other genera of the woods, such as *Daphne*, *Juniperus*, *Picconia*, *Rhamnus*, *Smilax*, *Taxus*, *Vaccinium*, *Viburnum*, etc., would be distributed by frugivorous birds, and wisely adds that "we are not restricted in this respect to birds that regularly visit the Islands." He instances the Missel-thrush as having possibly introduced the seeds of the yew (*Taxus baccata*) into the Azores. The Missel-thrush is a very rare straggler to the Azores and has never been recorded from the Canaries. On the other hand, the Continental Song-thrush (*Turdus philomelus philomelus*) is a regular winter visitor to the Canary Islands, while both the Redwing (*Turdus musicus*) and the Fieldfare (*Turdus pilaris*) are occasional visitors to this group. All three may well be responsible for the introduction of seeds into the Islands. The yew-tree is not known in the Canaries, and as the Missel-thrush is also unknown, even as a rare straggler, this indirectly lends colour to Guppy's theory of the introduction of yews into the Azores.

Dealing with the plants of the highlands, it has been suggested that birds are again the main source of dispersal, the small seeds adhering to the feathers of

ground-building species, and also becoming attached to the mud, which sticks to the feet and tarsi. In this connection I would specially mention the Woodcock (*Scolopax rusticola*), which at the present day is undoubtedly resident throughout the year in both the Azores and in certain of the Western Canary islands. Specimens from both localities are indistinguishable from the typical European race, and this induces me to believe that this bird has only recently become resident in the groups, or that immigration (the Woodcock is a highly migratory species in other parts of the world) still actually takes place, although there is absolutely no evidence in support of this.

A ground-nesting bird, which undoubtedly does pass through the Islands on migration regularly at the present day, is the Migratory Quail (*Coturnix coturnix coturnix*), a species having a very extensive range in Europe, Asia, and Africa. There is, moreover, a resident race of the Quail, living throughout the year in the Canary Islands, which used to be mistaken for the African Quail (*C. c. africana*), but which Dr Hartert has recently shown to be a distinct geographical race, closely allied to *C. c. africana*, which he has named *C. c. confisa*, and which is found also in Madeira (*vide Nov. Zool.*, xxiv., 1917, p. 423).

Many seeds are known to germinate more freely when they have passed through the alimentary canal of a bird. Guppy tells us that the Wild Duck swallows the hard nutlets of *Carapaceæ* in quantities, and that these fruits readily germinate, after being removed from the stomach and intestines. He instances the seeds of *Carex flava*, *Scirpus multicaulis*, and *S. palustris* as likely to have been originally transported to the Azores in the stomach of waterfowl.

C. flava is not known in the Canaries, but eight

other species of the genus *Carex* are recorded from the Canary Archipelago, the majority of which are found also in Madeira, Morocco, Tunisia, South Europe, and Asia Minor, while *S. palustris* is found in the Canaries, Morocco, Algeria, Egypt, Europe, etc. The number of waterfowl regularly passing through the Canary Archipelago, and (presumably) continuing their line of flight along the Moroccan coast to North Africa and Europe, is very large indeed. Eight species of Duck alone have been recorded from the group, one of which—the Marbled Duck—is an African and South European species, while the others are all well-known European ducks.

The shore-, marsh-, and water-birds (excluding Petrels, Gulls, Terns, and Sea-divers) which have been recorded from the Canaries total over fifty species, many of which are regular migrants in spring and autumn. It may be imagined what a strong influence these birds have had on the dispersal of the strand-plants, and of those found growing in such swampy places as the Arguineguin “Charco,” and the Maspalomas “Charco” in Gran Canaria.

Despite the work of Hooker and Guppy, a great deal remains still to be done in the Canary Archipelago before the problems of plant dispersal in this group are thoroughly exhausted. I would here only call the attention of naturalists, who may chance to visit the Islands, to a fascinating subject which would well repay further investigation. The questions connected with plant dispersal are not easy to answer without previous experience of the kind, and unless one is able to spend some time in the Islands little can really be accomplished.

Guppy has dealt thoroughly with this subject, as regards the Azores, in the delightful volume which I have cited so often. A similar work, dealing with the

Canaries, would be of enormous value to all students of plant dispersal in Oceanic islands. A comparison could then be drawn from this point of view, between two of the most interesting Archipelagoes in the world.

But enough has been said to give the reader some slight idea of the great richness and variety of vegetation of the Canary Islands, and I hope will add a little more interest to the narrative contained in the following pages. Birds, and birds alone, were my object, and although an ornithologist, worthy of the name, naturally takes more than a passing interest in the natural history of the region in which he is working, yet in these days of specialisation it requires a particular knowledge to be able to write of the plants and trees, of the rocks, and of the zoology contained in such prolific Islands as these. This is my excuse, if excuse be needed, for having made such extensive use of the writings of such authorities as Pitard, Proust, Salter, and Guppy, who have studied the Archipelago from the point of view of the particular subject which they have so successfully made their own.

CHAPTER VI

OBSERVATIONS ON THE DISTRIBUTION OF ANIMAL AND BIRD LIFE IN THE CANARY ISLANDS, AND SOME PROBLEMS WHICH THEY SUGGEST.

IN a preceding chapter, dealing principally with Geology, the question of the origin of the Canary Islands is discussed, and the opinion expressed that they had been formed by the gradual upheaval of the ocean bed. That this theory is not universally accepted, is shown by the ideas voiced by a French zoologist—M. Germain—and quoted at some length by Termier in his paper on Atlantis. Briefly, Germain is convinced of the continental origin of the fauna of the four groups of African islands—the Azores, Madeira, Canaries, and Cape Verde Archipelagoes.

From a study of the terrestrial fauna inhabiting the Islands at the present day, he believed that the true explanation lay in the fact that the Islands were once connected with the African continent up to an epoch very near our own, at the very least toward the end of the Tertiary period. A close study of the avifauna of the group would appear to contradict the views expressed by Germain, as we shall see when we come to look into the question more fully.

I propose to devote this chapter mainly to a review of the ornithological problems which the Archipelago suggests, especially as regards the distribution of the

birds found therein, and their bearing on the formation of the Islands.

The Ornis of the Islands comprises in all 217 species and subspecies, of which 61 are resident¹ and 156 migratory.

When we come to examine the resident forms more closely, we are at once struck by the large percentage of species and subspecies which are peculiar to the Archipelago.

Of the resident species 60 are land birds and one is a Wader (*Hæmatopus*), and these belong to 38 genera, representing 19 families. We will here deal only with the 61 resident birds, of which no less than 42² species and subspecies are confined in their distribution to the Archipelago and occur nowhere else in the world.

Ornithologists—even ornithologists belonging to what we may call the New School—differ as to the exact number of species and subspecies inhabiting the Canary Group, which may rightly be considered sufficiently differentiated to be separated from the typical race, but in any case the number is very large indeed. When Wallace wrote his *Geographical Distribution of Animals*, we find that there were only five species recognised as peculiar to the Islands!

It must not be thought that even one subspecies has in this short lapse of time since Wallace wrote, become sufficiently modified to be considered distinct from the continental form. It is, however, an instance of the strides which ornithology has made in recent years,

¹ Birds which are generally found in the Canary Islands throughout the year, which regularly breed in the Archipelago, and, so far as we know, are not migratory in any way except perhaps between the islands, are included in this category.

² If the resident Hoopoe is considered a distinct subspecies, the number of birds peculiar to the Archipelago would be 43.

during which the birds of this group have been seriously collected and studied.

The fact that so many forms have undoubtedly become differentiated, shows what a remarkable influence complete isolation has on the feathered population of an island once the bird is no longer able to interbreed with the continental stock from which it sprang. Exactly when the immigration of birds which peopled the Canary Islands took place, it is impossible to say; Wallace tells us that on the whole the birds of Europe, in the Miocene period, were very like those now living, with the addition of a few tropical forms. "We have the same indications of a luxuriant vegetation and subtropical climate, and the same appearance of Oriental and especially of African types." Further back, in the Eocene, however, we find ourselves almost wholly among now extinct forms of birds.

In the case of certain species, the immigration must have been remote, as some of the forms are *strikingly* modified, and these forms are, with one or two exceptions (*i.e.*, the Chiffchaff and the Blackcap), all species which have not received any newcomers from the parent stock; thus the purity of the Island races is kept up. In the case of the Chiffchaff and Blackcap, these are only very slightly modified, and migrants belonging to the typical European race undoubtedly pass through the Islands, but (as far as we know) these visitors do not now remain to breed, and the Island strain is in consequence not interfered with. We shall therefore expect it to become more defined as time goes on.

If the Canary Islands had ever been joined to the mainland, as M. Germain asserts, then surely the birds now inhabiting the Islands would have at any rate their nearest affinities with African species living on the adjoining continent. But this is not the case.

The birds of the Canaries are much more nearly allied to species inhabiting Southern Europe than to the African fauna; while the few mammals need not be taken into consideration, as, with the exception of the Bats, which will be dealt with separately, all have been introduced through the agency of man.

One of the most remarkable facts relating to the Ornithology of the Canaries is the peculiar distribution and variety of the endemic forms. To give a few instances—In the pine forests of Tenerife lives a remarkable Blue Chaffinch (*Fringilla teydea teydea*); in the pine forests of Gran Canaria, just about 50 miles away, lives another Blue Chaffinch (*Fringilla teydea polatzeki*), differing only in minute points from the Tenerifean bird. Both forms must have originated from a common ancestor which may have lived in the ancient pine forests of North Africa. I made this suggestion in a paper¹ which I wrote in 1920, and in a review² of my work Dr Witmer Stone, President of the American Ornithologists' Union, apparently endorsed my opinion as he wrote (*loc. cit.*), "It is inconceivable that such strikingly different birds could have been differentiated on the Islands from the *F. cælebs* stock, and the only alternative is that the mainland stock, which originally, contributed their ancestors to the Islands, must have become extinct, or is now represented by a few lingering individuals in some remote retreat not yet discovered." It is of interest to note that this is not the only view held of the origin of the Blue Chaffinches, for Colonel Meinertzhagen recently wrote³: "We believe that *F. teydea* was once but a geographical race of *F. cælebs*, but that isolation has produced a species." Practically the same

¹ *Ibis*, 1920, p. 555.

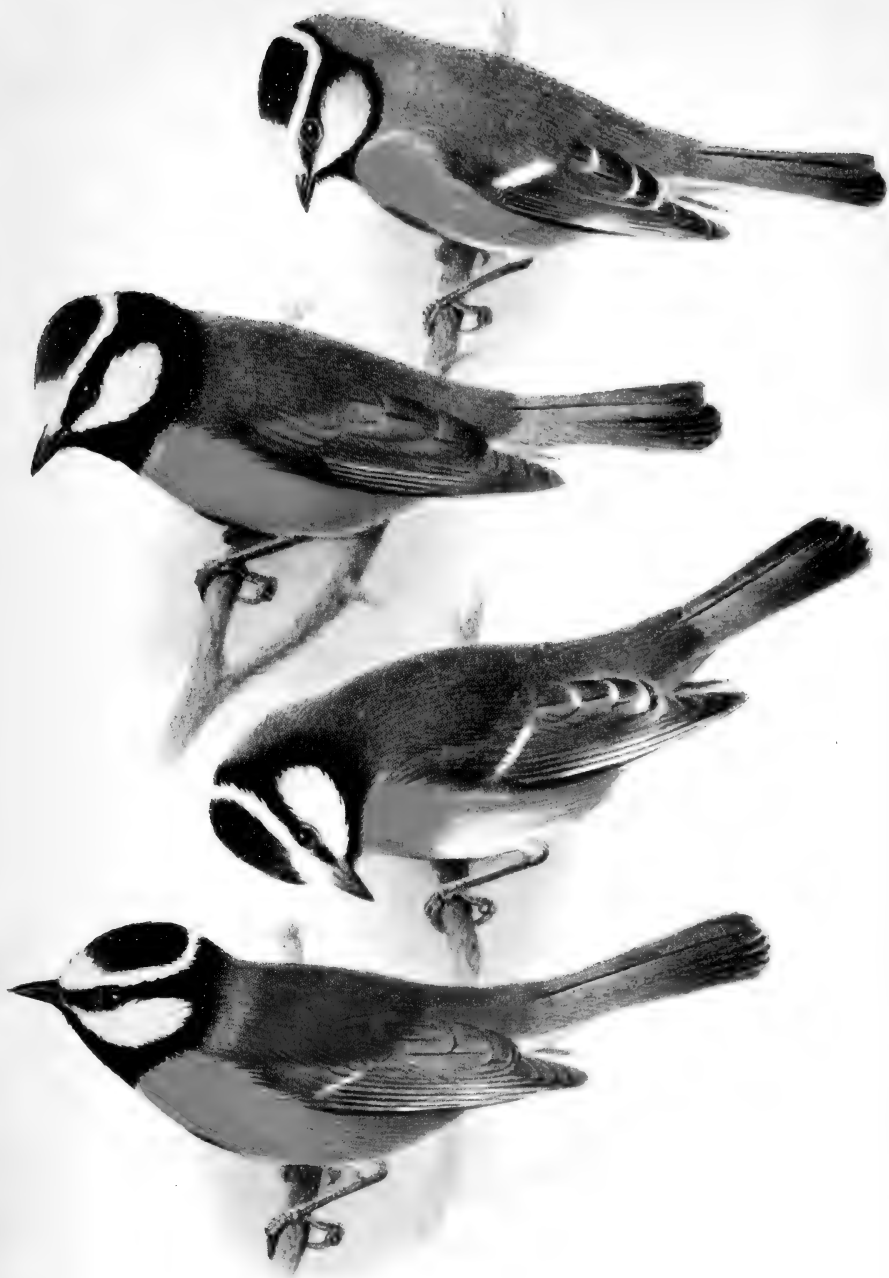
² *Auk*, 1920, pp. 608-609.

³ *Ibis*, 1921, p. 536.

view is held by Professor E. Trouessart¹ of Paris. Here, then, are two very different opinions as to the origin of the Blue Chaffinches.

Similarly the Great Spotted Woodpeckers in Tenerife and Gran Canaria are two distinct races of our European Great Spotted Woodpecker—the two insular forms, *Dryobates major canariensis* and *D. m. thanneri*, differing from each other only in the intensity of their colouring, although living under apparently identical conditions. Both these Canarian forms are very nearly allied to the typical *D. m. major*, the North European bird. The way in which the two Canarian forms reached the Archipelago can clearly be seen, the birds spreading through Great Britain (*D. m. anglicus*), Southern Spain, and Portugal (*D. m. hispanus*), over North Africa—where various offshoots are found in Algeria and Tunisia and another race in Corsica—through Morocco (*D. m. mauritanus*), and finally crossing the narrow belt of sea to the Canary Islands, where they have again split into two races in Gran Canaria and Tenerife. In this connection it must be borne in mind that it does not necessarily follow that the oldest (parent) race is that of the typical species. The type is, of course, the first of that particular little group of closely allied races to be described and named by scientists; it naturally does not follow that this is the root-species from which the other allied forms have sprung. In the case of the Woodpeckers here cited, there is no evidence to show which of the various races mentioned is the parent race, though it is fairly obvious that the bird has spread southwards. We are probably right in inferring that *Dryobates major* is of European origin, and that the Mediterranean, African, and Canarian forms have sprung from the European stock.

¹ *Rev. gen. des Sciences*, November 1912, p. 857.



Canarian Titmice.

The Islands possess four closely allied Titmice and three Chaffinches in addition to the two Blue Chaffinches already mentioned. The common Canarian Chaffinch (*Fringilla cœlebs canariensis*) inhabits the islands of Tenerife, Gran Canaria, and Gomera; while the other two islands of the Western Group—Palma and Hierro—each have their own peculiar Chaffinch—*F. c. palmæ* and *F. c. ombriosa*—the islands of the Eastern Group (those lying nearest Africa) having no Chaffinch living on them at all. (See Plate facing page 132.)

Again, there are four races of Titmouse living in the Archipelago. On Tenerife, Gran Canaria and Gomera, the Tenerife Blue Tit (*Parus cœruleus teneriffæ*) is found; Hierro and Palma each have their own forms, *P. c. ombriosa* and *P. c. palmensis*, thereby agreeing with the peculiar distribution of the Chaffinches, while a different Pale-coloured race, *P. c. degener*, lives on the two large islands in the Eastern Group. These are all geographical races of the European Blue Titmouse (*Parus cœruleus cœruleus*) which have extended southwards to the Canary Islands. On its immigration south it spread over the greater part of Morocco, where we find another race (*P. c. ultramarinus*) living at the present day. All these races have assumed special characters in the isolated districts which they inhabit, and exhibit a variety of colouring in their plumages. The Palman Titmouse, for instance, through living in a luxuriant mountainous island, is much more intense in the colouring of its plumage than the Pale form inhabiting the low waterless islands of Fuerteventura and Lanzarote. (See Plate facing page 126.)

Several birds, such as the Thick-knee, the Chiffchaff, the Brown Linnet, the Kestrel, and the Barn Owl, are represented by two different subspecies (insular varieties) in the Eastern and the Western Groups of islands, a

fact which is not really very surprising when we consider how diverse are the physical characteristics of the islands themselves.

There are other cases of curious distribution which are more difficult of explanation than those instanced: one form of the Short-toed Lark—*Calandrella minor polatzeki*—inhabits the islands in the Eastern Canary Group, and also the island of Gran Canaria¹ in the Western Group, while on Tenerife a totally different Short-toed Lark—*Calandrella minor rufescens*—is the only form known, and this has a very local distribution even on this one island.

One more instance will suffice—that of the peculiar Chat, *Saxicola dacotiae dacotiae*, which is known only from the island of Fuerteventura. On Lanzarote, an island very similar in its physical characters, separated from Fuerteventura by a very narrow strait not a mile in width, this Chat is quite unknown, but on two of the three small outlying islets—Montaña Clara and Allegranza—which lie off the north coast of Lanzarote, I discovered an entirely new Chat, very closely allied to the Fuerteventuran bird, which I named *Saxicola dacotiae murielae*, and figured in the *Ibis*, 1914, Pl. 5. Indeed, so nearly allied are these two island Chats that before comparing them I believed them to belong to the same species. This is perhaps the most remarkable instance of distribution to be met with in the whole group. Almost all the cases cited are of species and subspecies peculiar to the Archipelago, and found nowhere else in the world.

There is still another curious point in the distribution of the birds in the Canary Islands, *i.e.*, the inexplicable absence of certain birds which are found in the Archi-

¹ The form of Short-toed Lark inhabiting Gran Canaria has now been separated as distinct from the other races. I am doubtful of its validity.

pelago from certain of the islands. For instance, the Chough (*Pyrrhocorax pyrrhocorax*) is absent from all the islands save Palma, where it simply swarms. It does not even occur temporarily in Gomera or Hierro, which islands are well within sight of Palma, and one would imagine equally suitable as a habitat. The Kite (*Milvus milvus milvus*) has never been recorded from Palma though it is common in Gomera and Tenerife. The Partridge (*Alectoris barbara kœnigi*) has not yet succeeded in gaining a footing in Palma though several times introduced from Gomera, where it abounds. The Egyptian Vulture (*Neophron p. percnopterus*) is likewise absent from Palma though common in the other islands. Again, why is there no Woodpecker in the pine forests of Palma, Gomera, or Hierro?

These are the most remarkable cases of the kind which the avifauna presents, and this very limited distribution of the species named is difficult to account for. The absence of certain food, or of particular cover, or suitable nesting sites, are the obvious causes which first come to mind, and may account for other cases of anomalous distribution, but hardly for the several cases I have cited.

Special vegetation means special food upon which many seed- and fruit-eating species are entirely dependent. The two fine Canarian Pigeons live almost entirely on the seeds of certain trees—Bolle's Pigeon and the Canarian Laurel Pigeon subsist to such an extent on the fruit of *Laurus foetens* that when the Laurel was exterminated in Gran Canaria, Bolle's Pigeon, which formerly thrived in that island, completely disappeared.

There is no more fascinating study in bird-life than that of insular varieties, and one naturally speculates on the reasons for such variation having taken place, and

attempts to follow step by step the evolution of the various forms. An insular fauna is almost as remarkable for the species which have not altered in any way from the continental stock, as for those which have become highly modified. Thus in the Canary Islands it has already been mentioned that there are two Barn Owls; the Barn Owl living in the Eastern Islands of the Archipelago is a very specialised form, having a long thin beak, and has been named in consequence *Tyto alba gracilirostris*, while the Barn Owl living in Gran Canaria and Tenerife not only differs from the Eastern Islands form, but is indistinguishable from the Barn Owl found in France, Spain, and North Africa—*Tyto alba alba*—a very singular fact.

Again, take four well-known desert birds—the Houbara Bustard, the Courser, the Thick-knee or Norfolk Plover, and the Trumpeter Bullfinch. All these birds are found in the island of Fuerteventura in the Eastern Canary Group, and also in North Africa, but—and this is the point—the representatives of the Bustard, Thick-knee, and Trumpeter Bullfinch in Fuerteventura, have all become differentiated from the African parent stock, and are recognised as distinct subspecies, but the Courser, which inhabits exactly the same type of country as the other three forms mentioned, has not become modified in any way, specimens from the islands being quite indistinguishable from those from the mainland; the explanation may lie in the fact that the Courser may have its numbers augmented from time to time by fresh arrivals from Africa, which remain to breed with the island birds, but no evidence to support this supposition is forthcoming. The Courser is a great wanderer. In Egypt, Mr Bonhote tells me, he has known it turn up to feed on certain caterpillars at a certain spot in the desert regularly in July and

August, and occurring there at that time of year only. It also must be remembered that for some unexplained reason the Courser is little prone to variation anywhere throughout its immense range.

Before touching on any alternative theories, we will attempt to review the evolution of Canary island birds *from Darwin's point of view*, a view which, since the study of embryology has progressed and since the Mendelian laws have been advanced by Mendel and his followers, must doubtless be modified to a certain extent—but of this more hereafter.

When Darwin wrote the *Origin of Species* he paid particular attention to the problems presented by insular faunas. Taking the Galapagos Archipelago (off the N.W. coast of South America) as a type, he wrote: "Each separate island of the Galapagos Archipelago is tenanted, and the fact is a marvellous one, by many distinct species; but those species are related to each other in a very much closer manner than to the inhabitants of the American continent, or of any other quarter of the world. This is what might have been expected, for islands situated so near to each other would almost necessarily receive immigrants from the same original source, and from each other. But how is it that many of the immigrants have been differently modified, though only in a small degree, in islands situated within sight of each other, having the same geological nature, the same height, climate, etc.? This long appeared to me a great difficulty, but it arises in chief part from the deeply seated error of considering the physical conditions of a country as the most important; whereas it cannot be disputed that the nature of the other species with which each has to compete is at least as important, and generally a far more important element of success. . . . Hence

when in former times an immigrant first settled on one of the islands, or when it subsequently spread from one to another, it would undoubtedly be exposed to different conditions in the different islands, for it would have to compete with a different set of organisms."

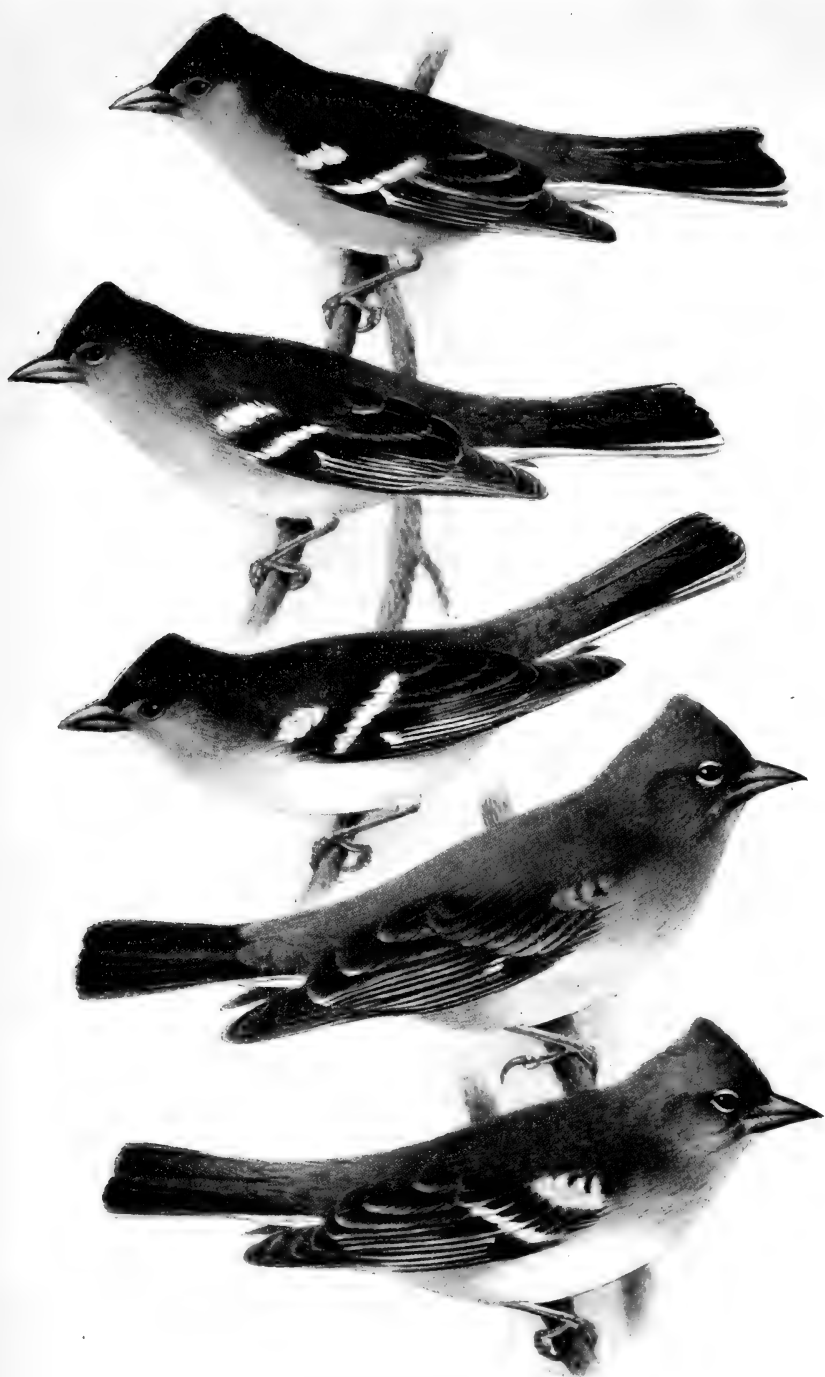
Although written about the Galapagos islands, this reasoning of Darwin's is so applicable in its entirety to the Canary Archipelago that I have not hesitated to quote it at length. Darwin contended that if from the above-mentioned causes a species varied, natural selection would probably favour different varieties in the different islands. Some species might spread, however, and yet retain the same character throughout the group. Darwin believed that this fact could be explained partly by the species which are not modified, having immigrated in a body, so that their mutual relations were not much disturbed, and partly by the frequent arrival of unmodified immigrants from the mainland with which the insular forms could interbreed.

When writing in another place¹ of the differentiation of island races in the Canary Group, I contended that the distinct races of certain species (as, for instance, the Tits and Chaffinches) found inhabiting different islands of the Western Group could be explained by successive invasions of migrating birds at remote periods, but it must be admitted, as pointed out by Dr Witmer Stone, that this supposition is hardly necessary, as birds introduced into two or more islands simultaneously may select a different sort of food on each island, even though the choice is the same, and may make other selections which, in course of time, may be reflected in their colour or size.²

The birds of the Canary Archipelago afford material

¹ *Ibis*, 1921, pp. 519-569.

² Cf. *Auk*, 1920, vol. xxxvii., p. 608.



Canarian Chaffinches.

as good for studying the evolution of species in Oceanic islands, and the effect of environment on the various forms, as those of the Galapagos islands. If the Canary Archipelago had once been joined to the mainland, the islands would have received their bird population from this source and not through migration, and the remarkable insular variation which is now so apparent in the avifauna would never have taken place, for, being one continuous land mass, the immigration would have spread over the entire Archipelago (as it now is) at the same time. The individuals would have had to contend with exactly similar conditions—the same enemies, the same climate, food, etc., etc.; for instance, the Titmouse of the Archipelago might, and probably would, differ by now from the continental form, but only one variety would be found instead of four distinct geographical races, as is the case at present; for if variation had taken place it would have been all in the same direction. The Tits would not have been isolated and cut off from one another until a much later period in the history of the Islands after they had become acclimatised and less likely to be affected by environmental conditions. The same applies to the Chaffinches, and to a lesser degree to many other Canarian subspecies.

Variation is the first and most fundamental evolutionary character, and as truly instanced by Lull, the causes of variation are among the chief causes of evolution itself.

The different factors which help to bring about variation are many and varied, and some have already been noted. Experience has shown that the presence or otherwise of other species with which an immigrant has to compete in its struggle for existence has as much to do with the differentiation of subspecies as

the physical conditions of the country. Complete isolation is perhaps the most important factor of all, but climatic conditions (especially dryness or moisture of the atmosphere), altitude, the choice of food, presence of enemies and consequent need of protective resemblance, need of adaptation to physical conditions to aid in search of food, and possible requirements of mimicry for purposes of aggression, all play their various parts to a lesser or greater degree in forming subspecies, or, as they are more correctly termed, geographical races.

It has already been explained why isolation is such a strong factor in the differentiation of a species, for once a bird is cut off from the parent stock it can no longer interbreed with it and soon begins to develop along its own lines, influenced by climatic and the other local conditions with which it has to contend. That climate has a great influence on birds is undoubted, the percentage of damp in the atmosphere and the amount of rainfall producing marked colour changes in the plumage. The greater the moisture the darker the coloration becomes, and *vice versa*. In the much quoted case of the Bermuda Goldfinch, which was introduced¹ at some unknown date into the Bermuda islands, it seems probable that the differentiation has taken place since the year 1873. It does not appear to have been found in the islands in that year when the naturalists of the *Challenger* Expedition explored Bermuda, but two years later a single example was recorded by Captain Savile Reid. In 1912 a series was obtained and described by Lieut. Kennedy, R.N., as a new form, on account of its distinctly darker coloration. The remarkable effect of environment—in

¹ Examination of the Bermudan race suggests that the bird was introduced from one of the Atlantic archipelagoes—either the Canaries, Madeira, or the Azores—in the writer's opinion most likely the last mentioned.

this case of a damp climate—on the colour of a bird has been strikingly shown by Mr Beebe, who subjected an example of the White-winged Dove of Arizona for some months to a very hot, damp, artificially-created atmosphere. At the end of this time the Dove had assumed a darker and richer plumage, and would, Mr W. L. Sclater tells us, if it had been examined without prejudice, have been referred to an entirely different species of *Melopelia*. The important point in this connection is whether or not the offspring of this Dove would be as dark as the parent, or whether they would revert to the original colour of their species. In taking the importance of this experiment into consideration, we must always remember that it was carried out under *artificial conditions*, and it is apparent that a bird or animal *in captivity* is much more influenced by its environment than is the case when the conditions are natural. This is to be expected, as the change of environment is so much more marked (loss of exercise, change of food, absence of enemies, etc.), than any to be found in nature where the bird might be likely to survive.

Remarkable instances¹ of the effect of climate on the plumage of certain birds have been recorded: Examination of a large series of Bustard Quails, which range from India, through Burma and China to Formosa and the Loo-Choo Islands, arranged in geographical order, showed that so closely was the general colour of the upper-parts associated with the amount of rainfall in the districts they inhabited, that it was possible to make a fairly accurate estimate of the number of inches of rain from the colour of the plumage of the Quails.

¹ *Vide* Ogilvie-Grant, *Bulletin of the British Ornithologists' Club*, 1915, vol. xxxv., pp. 133-34.

An equally striking case¹ is that of the remarkable correlation between the variations in plumage in the members of the genus *Gennæus* (The Silver Pheasants), and the degrees of elevation, drought, and rainfall, in the countries they inhabit.

The altitude at which a bird lives must undoubtedly be taken into account. This was exemplified in a fine collection of birds from Cameroon Mountain which I recently worked out² in the British Museum; out of 65 different species obtained by the collector³ on the vast mountain, which rises to over 13,300 feet, no less than 33 species were peculiar forms restricted to Cameroon Mountain. It must, of course, be remembered that birds living at a great altitude are probably confined to a certain belt of vegetation, and are thus almost as isolated as if they were living on an Oceanic island; the variation which takes place cannot, therefore, be put down to elevation alone, although the atmospheric conditions met with at the various altitudes doubtless play an important part.

It is impossible to estimate how much influence altitude has had on the birds of the Canary Islands, but in an Archipelago where the islands, which are permanently inhabited by land-birds, vary in altitude from 873 feet (Graciosa) to 12,200 feet (Tenerife), this factor must be taken into consideration. In the case of Tenerife, however, the Zones of Vegetation⁴ from sea-level to the summit of the Pico de Teide are not nearly so pronounced as on Cameroon Mountain, situated as it is just north of the Equator and on the mainland of Africa.

¹ *Vide* Stuart Baker, *Bulletin of the British Ornithologists' Club*, 1915, vol. xxxv., pp. 138-39.

² *Ibis*, 1915, pp. 473-526.

³ The late Capt. Boyd Alexander.

⁴ *Cf.* Chapter IV. of this book.

The presence of enemies and consequent need of protective resemblance is bound to have a modifying influence on any bird or mammal which first finds its way to a new habitat. The expression "protective resemblance" must not be confused with *mimicry*; the former is best described as the simulation by a living creature of the characters of some plant or non-organic object, whereas mimicry is the imitation by one living species of another living species for purposes of aggression or protection. There are no instances of the latter in the birds of the Canary Islands, and indeed, mimicry among birds is very rare indeed, and confined almost exclusively to the Cuckoos, no species of which is resident in the Canary Archipelago.

Protective resemblance, on the other hand, is a common phenomenon, and is well illustrated in the desert islands of Fuerteventura and Lanzarote by the resident race of the Houbara Bustard (*Chlamydotis undulata fuertaventuræ*), and by the Courser (*Cursorius g. gallicus*), the Sand-grouse (*Pterocles orientalis*), the Thick-knee (*Ædicnemus æ. insularum*), the Trumpeter Bullfinch (*Erythropsiza githaginea amantium*), the Short-toed Lark (*Calandrella minor polatzeki*), the young of the Grey Shrike (*Lanius excubitor kænigi*), the young of Meade-Waldo's Chat (*Saxicola d. dacotiæ*), and the Hoopoe (*Upupa e. epops*), and to a lesser degree perhaps by the Black Oystercatcher (*Hæmatopus niger meade-waldoi*). All these birds rely to a very large extent on their protective coloration to enable them to escape from their enemies. Black-and-white birds, such as certain Wheatears, are protected by their colouring in the same way as zebras and skunks, as the outline is thereby broken up. Black desert birds are similarly protected by their resemblance to deep shadows, but there is no instance of this in the Canary Islands. These desert

forms harmonise so exactly with the ground which they frequent that it requires a practised eye indeed to pick them out from their surroundings as long as they remain motionless. The Pale Titmouse (*Parus cæruleus degener*) is another form which has undoubtedly been influenced by the desert conditions of Fuerteventura and Lanzarote; its plumage is very much lighter than the allied forms inhabiting the Western Islands of the Group. A remarkably interesting case of colour adaptation is furnished by the Fuerteventuran Bustard. It is undoubtedly a descendant of the Houbara Bustard (*Chlamydotis u. undulata*) which lives on the mainland of Africa and is an inhabitant of sandy wastes in Morocco, Algeria, and the Sahara. The plumage of the African Houbara Bustard is of the usual colour found in desert-frequenting birds, and following out the theory of protective resemblance, this bird accords exactly with the ground over which it roams. This Bustard at some remote period presumably crossed from the Moroccan coast to the Canary Islands, and the first land which it sighted was naturally the most easterly island—Fuerteventura.

In Fuerteventura, the Bustard found ground well adapted to its requirements, a low desert island abounding in large plains, very similar to the African deserts which it had left, and, be it remembered, in the same latitude: moreover, though islands are usually damper in climate than the mainland, Fuerteventura is one of the driest islands in the world, and in normal years has an exceedingly small rainfall. There is, however, one great difference between it and the mainland, which, though not affecting the climate, does affect the external appearance of the island. Fuerteventura is volcanic in origin, and the bare plains are dotted and strewn with lumps of blackish basalt and lava, often half buried in the sandy soil.

When the African Bustard first found itself on this ground, its light sandy plumage no longer harmonised with its surroundings—in fact, the one character which contributed to its protection in the African deserts made it conspicuous in the Fuerteventuran waste. *Its plumage has, therefore, become modified*, and its back has become speckled and marked with black, *so that in course of time it harmonised exactly with its darker surroundings*, and now it is recognised as quite a distinct form (*C. u. fuerteventuræ*). This example is a good one, for very slight allowance need be made for this particular island being damper than the Sahara, the physical conditions of Fuerteventura and the African desert being much alike, although an island is bound to have a relatively damper climate than the North African deserts, though not necessarily a greater rainfall. I am inclined to believe that the variation in this case is genetic, and that if the island Bustard could be transported back to its original home its offspring would for generations remain perfectly distinct, but only an experiment could prove this, and we should have the damaging influence of an experiment carried out in unnatural conditions (captivity of the subject) to contend with.

I have mentioned the Black Oystercatcher as a possible example of colour protection. This bird frequents the black water-worn lava of which the coasts of the small islets are largely composed; the black plumage of the Oystercatcher renders the bird extremely difficult to see, and its presence is only detected by its brilliant bill, which it is certainly difficult to include in the scheme of colour protection. Mr Bonhote reminds me that in the Bahama Islands there is a Black Oystercatcher which inhabits *white* coral reefs! Protective resemblance is obviously not essential for this bird's existence, and it may well be that the Canarian Oyster-

catcher derives no benefit from its coloration either. It can be imagined, however, how conspicuous our British Black-and-white Oystercatcher would be in such surroundings, and the red bill of the Canarian Black Oystercatcher probably serves some purpose in assisting the bird to obtain its food.

While on the subject of plumage resemblance and its relation to the colour of the ground, I cannot refrain from drawing the attention of the reader to the striking case of the Crested Larks.

The writer visited Tunisia and Algeria¹ in the early spring of this year (1921), travelling 140 miles into the Sahara desert. During the tour remarkable cases of adaptation to their physical surroundings were constantly noted amongst the birds—no case being so curious as that of the Long-billed and Short-billed forms of the Crested Larks. This striking case of the genus *Galerida* has already been instanced by Dr Hartert at a meeting of the British Ornithologists' Club.² A fine series of African Crested Larks was there exhibited with glass tubes, containing samples of the actual soil upon which they were shot, attached to their legs. The very dark Algerian form, *Galerida theklæ harterti*, lives on dark soil; two other forms, *G. t. hilgerti* and *G. t. carolinæ*, have reddish and clay-coloured plumage, and these frequent reddish clay soil. *G. t. deichleri* is a very pale form and lives on the desert sand. There are many more instances, but those given are typical of all the races. Dr Hartert is of opinion that in the case of these Crested Larks there is no doubt that it is not the amount of moisture and of rainfall (as in the case of the Bustard Quails),

¹ For an account of this journey and the bird-life encountered, see the *Ibis*, 1921, pp. 387-414, "First Impressions of Tunisia and Algeria."

² Hartert, *Bulletin of the British Ornithologists' Club*, June 1915, vol. xxxv., pp. 132-33.

but actually the general colour of the soil on which they live which materially influences their coloration. This is not my opinion as regards the mountain form (*G. l. harterti*), but in the case of the true desert races it is difficult to find any other explanation. It is strange that there is no representative race of the Crested Lark to be found in any of the Canary Islands.

A more important factor which must influence a bird on its first appearance in any country—and one which it is not always easy to gauge—is the need of adaptation to physical conditions to aid it in its search for food. Structural changes in a bird may usually be put down to this cause, and it is a fact that several of the subspecies which have been described from the Canary Islands have longer and more robust bills, thicker tarsi, and longer claws than their nearest allies on the mainland. The difference is often minute, but it is none the less constant. The curious modification which the Eastern Canary Islands form of the Barn Owl has undergone must most probably be ascribed to this cause, though it is hard at first to see why an Owl inhabiting a dry desert island and living in holes in lava cliffs should require a more slender bill than the Owl living under more normal conditions in the fertile Western Islands. Certainly the latter can find more normal food to eat (rats and mice are plentiful in these islands), whereas the bird in Fuerteventura and Lanzarote has very likely had to modify its diet to fall in with existing conditions. I feel pretty certain that the Eastern Island bird lives largely on lizards, and its narrower, sharper bill would undoubtedly be of assistance to it in catching these lively reptiles and pulling them out of their holes in the lava.

At times such a clear case of adaptation comes

before us that it is impossible not to place to this cause more than we can see with our inexperienced eyes. For instance, the Finches of the genus *Geospiza* inhabiting the Galapagos islands have developed a remarkable series of bill-modifications through living on the leaves, fruit, and seeds of cacti of the genera *Cereus* and *Opuntia*, plants which are armed with formidable thorns and spines, and which can only be attacked by birds having equally formidable bills.

In Professor Punnett's book on Mendelism, Darwin's theory of the variation of species is very clearly set out as follows: "In any species of plant or animal the reproductive capacity tends to outrun the available food-supply, and the resulting competition leads to an inevitable struggle for existence. Of all the individuals born only a portion, and that a very small one, can survive to produce offspring. The nature of the surviving portion is not determined by chance alone. No two individuals of a species are exactly alike, and among the variations which occur some enable their possessors to cope more successfully with the competitive conditions under which they exist. In comparison with their less favoured brethren they have a better chance of surviving and consequently of leaving offspring. Offspring tend to resemble their parents more than other members of the species and favourable variations are transmitted."

Variation, then, is commenced in a species by any one of the factors which we have been discussing, or maybe by a combination of all. The variation having once started, it is maintained by Natural Selection, that process whereby certain members of the same species are more or less rapidly eliminated, while others are able to survive. This is the natural outcome of the struggle for existence; only a certain number of birds can exist

in an island if they continually keep on increasing; finally there must be a scarcity of food—particularly in desert islands; the birds fight for the food amongst themselves, the fittest survive and the weak are exterminated, or else the weakest individuals take to another diet, and in course of time themselves become differentiated. This is not the place to discuss the complicated laws of Heredity.¹ Briefly, the function of Heredity is to pass on to the offspring the variation produced in a *race* of organisms. Thus the progressive modification of species by the agency of Variation and Natural Selection,² which we call Evolution, continues. New forms arise and the laws of Heredity complete the process.

That, at any rate, is what I conceive Darwin's explanation of the origin of the many forms of birds now inhabiting the Canary Islands would have been—and in the opinion of the writer the explanation holds good in a great many instances, as the feathered population of the Canary Islands at the present day is largely made up of true *geographical* subspecies whose variation is directly due to the action of environment. The great point which is open to discussion is this:—Can the effect of the environment in these geographical races, which in many Canary island birds consists merely of a different tone of colour of the plumage (either paler or deeper), be transmitted to the young by the parent—that is to say, is the *germ-plasm* affected? Darwin believed that such superficial

¹ The reader may here be referred to Mr J. L. Bonhote's book, *Vigour and Heredity*, and to Professor Arthur Thompson's *Heredity*.

² The effect of Natural Selection as an evolutionary factor has been summarised thus:—1. Under new conditions harmful characters will be eliminated by selection. 2. Beneficial characters are intensified and modified. 3. The great body of characters neither harmful nor beneficial will persist through Heredity.

characters as colour-shade in the plumage could be transmitted to the young. The opponents of the Darwinian theory deny that this can be done, and affirm that if a bird varies through environmental causes, *unless* the *gamete* is affected, the bird will, when returned to its original home, revert to the original stock. Mendel's experiments and those of his distinguished followers, Professors Punnett and Bateson and others, bear out this rule, but—and this is the point—their experiments have been made on plants, on domesticated animals, or on animals and birds in captivity, and consequently in artificial and therefore unnatural surroundings. To account for highly differentiated species the mutational theory is advanced (the mutationist believes that owing to some fundamental change in the organism of the bird the gamete is directly affected), viz., that the change takes place suddenly for some deep-seated reason, often impossible to explain, and the colour of the plumage or even the structure of the bird itself is affected. Once it is accomplished, natural selection assists in the evolution of the species, but as the germ-plasm has been affected the characters thus acquired *can* be transmitted to the young. These, then, as the writer understands them, are the two principal theories, one or other of which is usually accepted by naturalists at the present day. I cannot help but believe there is truth in both theories, they do not seem to be so opposite as certain of their supporters would insist. If environment can have such an effect on the external characters of a bird, surely the gamete can be affected by other causes which, though not always apparent to us, are no less active? In any case, I believe that Natural Selection *must* play a strong part whether the bird is an environmental subspecies or whether it is a mutational variety. Again,

it has not been proved to the satisfaction of the writer that an acquired character in a true geographical (environmental) race can not be passed on from parent to young *when the bird is breeding in the wild state*.¹ I have myself taken the youngest nestlings whose feathers show the characters acquired by the particular subspecies to which they belong. The Mendelian will answer that the second the offspring emerges from the egg it is subjected to the same action of environment which caused its parents to have a darker or lighter plumage—but what a lightning effect of environment. It is surely as difficult to believe that this is the true explanation as it is to prove that the embryo has indeed acquired the characters of its parents.

In a conversation I recently had with Dr Frank Chapman, Curator of Birds in the American Museum of Natural History, Dr Chapman gave several instances in which he had himself taken nestlings in South America which resembled their modified parents from the earliest moments when their feathers appeared. Doubtless instances of the kind could be multiplied in hundreds.

Let us for one moment look at the resident Canary island birds, the majority of which are restricted to the Atlantic islands. First we will give the lists, using only the English names for the birds—the Latin equivalents will be found in Appendix B.

A. *Birds Restricted to the Canaries.*

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|-----------------------------|---------------------------------|
| 1. The Canarian Raven. | 5. The Hierran Chaffinch. |
| 2. The Trumpeter Bullfinch. | 6. The Teydean Blue Chaffinch. |
| 3. The Canarian Chaffinch. | 7. The Canarian Blue Chaffinch. |
| 4. The Palman Chaffinch. | 8. Meade-Waldo's Brown Linnet. |

¹ Subspecies *in captivity* usually, if not invariably, breed true to their race, so aviculturalists assure us.

A. Birds Restricted to the Canaries—continued.

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|--|---|
| 9. Hartert's Brown Linnet. | 28. Thanner's Great Spotted Woodpecker. |
| 10. Thanner's Corn Bunting. | 29. The Slender-billed Barn Owl. |
| 11. The Rufescent Short-toed Lark. | 30. The Canarian Long-eared Owl. |
| 12. Polatzek's Short-toed Lark. | 31. The Canarian Buzzard. |
| 13. The Canarian Grey Wagtail. | 32. The Tenerifean Sparrowhawk. |
| 14. Berthelot's Pipit. | 33. The Fuerteaventuran Kestrel. |
| 15. The Tenerifean Gold-Crest. | 34. The Fuerteaventuran Bustard. |
| 16. The Tenerifean Blue Titmouse. | 35. The Eastern Canarian Thick-knee. |
| 17. The Hierran Blue Titmouse. | 36. The Western Canarian Thick-knee. |
| 18. The Palman Blue Titmouse. | 37. Meade-Waldo's Black Oystercatcher. |
| 19. The Desert Blue Titmouse. | 38. The Canarian Laurel Pigeon. |
| 20. Koenig's Grey Shrike. | 39. Bolle's Canarian Pigeon. |
| 21. The Canarian Black-headed Warbler. | 40. The Canarian Rock Pigeon. |
| 22. The Canarian Chiffchaff. | 41. The Canarian Red-legged Partridge. |
| 23. The Lanzarote Chiffchaff. | 42. Koenig's Canarian Rock Partridge. |
| 24. The Superb Redbreast. | |
| 25. The Fuerteaventuran Chat. | |
| 26. Muriel's Chat. | |
| 27. The Canarian Great Spotted Woodpecker. | |

B. Birds Restricted to the Canaries and Madeira.

- | | |
|-------------------------------|--------------------------|
| 1. The Madeiran Rock Sparrow. | 4. The Pale Redbreast. |
| 2. The Dusky Blackcap. | 5. The Canarian Kestrel. |
| 3. Cabrera's Blackbird. | 6. The Madeiran Quail. |

C. Birds Restricted to the Canaries, Madeira, and Azores.

- | | |
|--------------------------|----------------|
| 1. The Little Goldfinch. | 2. The Canary. |
| 3. Heineken's Blackcap. | |

D. Birds Restricted to the Canaries, Madeira, and Cape Verde Islands.

1. The Beautiful Spectacled Warbler.

E. Birds NOT Restricted to the Atlantic islands but of General Distribution.

- | | |
|-----------------------------------|---------------------|
| 1. The Red-billed Chough. | 5. The Common Kite. |
| 2. The Spanish Sparrow. | 6. The Osprey. |
| 3. The Mediterranean Barn Owl. | 7. The Courser. |
| 4. The Egyptian Vulture. | 8. The Woodcock. |
| 9. The Black-bellied Sand-Grouse. | |

A glance through these lists will soon convince anyone who is familiar with the birds that by far the greater number of the races enumerated would be classed by the followers of Mendel as "environmental subspecies," whose variation has been brought about "by the action of the environment on the *soma* during the lifetime of the organism, and which effect cannot be passed on to future generations." They believe that the variations are "essentially superficial and would quickly disappear if the organism were transferred from its normal environment" to some other of a different nature. On the other hand, they would probably put down the marked differentiation shown by the Blue Chaffinches, the two Chats, the Black Oystercatcher, and the two Laurel Pigeons to mutational variation, "in which the variation is discontinuous and dependent on the presence in the organism of definite factors which are resident in the *germ-plasm*, and which are therefore heritable."

The Darwinian explanation would be that all these species had evolved "little by little" through the agency of natural selection—that the great majority of the birds in the above lists were "incipient species," as the main factor—complete isolation—was present. The Chaffinches of the Canary Islands are cited by Meinertzhagen as an instance of this very subject; he believes that the *F. cælebs* group "are moving along the same path of evolution as did *F. teydea* and are undoubtedly *incipient* species"—an explanation which a great many ornithologists will be disposed to follow. But enough has been written to convince the student of evolution and variation in insular faunas that there are two sides to every question, and that until another master mind such as Darwin appears on the scene we can but accumulate evidence to place before him. Those who wish to see the case stated by followers of

the two different Schools of thought (in the ornithological world) may read with advantage the letter¹ by Dr Lowe and Mr Praed on "The Last Phase of the Subspecies" and the answers² from Colonel Meinertzhagen, entitled "Some Thoughts on Subspecies and Evolution"; from Mr J. L. Bonhote on "Subspecies and Evolution,"³ and from Miss Maud Haviland and Dr Lowe⁴ on the same subject,⁵ which have appeared in the invaluable Quarterly Journals of the British and American Ornithologists' Unions.

The writer believes that we have not yet arrived at that state of knowledge when the followers of either the Darwinian or Mendelian Schools can state definitely what does or does not take place in the evolution of species not subjected to artificial conditions—but we have at least got some material to work upon. A close study of the evolution of birds in the Canary Islands must surely throw some light on the problems connected with this engrossing subject.

Mr J. L. Bonhote, author of *Vigour and Heredity*, has been kind enough to give me his views on this subject, with particular reference to this chapter. He considers that subspecies should be restricted to forms that have been produced entirely by environment, and should include, as a matter of convenience, island forms so long as it is clearly recognised that these owe their differentiation partly or entirely to isolation. (This point is well brought out in this chapter, where the differentiation shown in the resident Chiffchaff and Blackcap, continental forms of which pass through the Islands on migration, is very slight compared with that of the Canarian races of other species. In the case of these two species, of course, the isolation factor is

¹ *Ibis*, 1921, pp. 344-47 *et seq.*

³ *Ibis*, 1921, pp. 720-25.

⁴ *Auk*, 1922.

² *Ibis*, 1921, pp. 528-37.

⁵ *Ibis*, 1921, pp. 752-54.

practically non-existent.) Mr Bonhote is firmly convinced that small variations due to environment are inherited; the degree (or intensity) of the inheritance depending on the number of generations that the particular species has been under that particular environment, and in support of this he brings forward several facts. In further discussing this subject, he propounds a somewhat novel theory as to what a species really is, which, if it be correct, certainly helps to bring the two rival Schools into line. He suggests that there exists in nature a number of factors (possibly or probably) with a Mendelian inheritance. Each true species is composed of a certain number of these factors, a nearly-allied species will perhaps have 98 per cent. of the same factors, more distant species perhaps only 50 per cent., and so on.

All subspecies of a given species will contain exactly the same factors, but their somatic expression will be different. This somatic expression is inherited to a certain extent, but is fluctuating, and varies after a certain number of generations according to the environment. On this reasoning, therefore, a true subspecies or geographical race can never be considered as an incipient species. A new species may sometimes be brought about by the "omission" or "latency" of one or more "factors," forming what is known as a "mutation," but he does not assume that the "factors" themselves are immutable—in fact, in a survey of the Animal Kingdom much evidence will be found tending to show that the factors themselves may change and so produce a new species, but it would be out of place to discuss that point here.

There is one more point which we have only lightly touched upon. How did the present resident birds of the Canary Islands first come to inhabit the Archipelago?

Some forms, notably the two Blue Chaffinches

(*Fringilla teydea*), are undoubtedly of very ancient origin, for although they are true Chaffinches, whatever the theory of their evolution is, they cannot be said to have any near allies in Europe, Asia, or Africa, at the present day; either the continental parent stock has completely died out, or, if they are indeed descended from the Common Chaffinch their ancestors must have come to the Islands with the earliest feathered inhabitants.

The majority of the resident species are for the most part clearly of European—a few of North African—origin and when we turn to the large list of migratory birds which have been recorded from the Islands this is not difficult to determine.

The 156 migrants¹ fall into seven classes, which I give in full as they show how diverse are the sources from which the Islands receive their bird population at the present day, *i.e.* :—

	No.
1. Partial Residents	5
2. Birds of Passage, including 1 in List (1); 2 in List (4); 9 in List (5)	32
3. Annual Visitors	5
4. Summer Visitors	9
5. Winter Visitors	15
6. Occasional Visitors	30
7. Rare Visitors	72
	<hr/>
	168
Deduct, in duplicate lists	12
	<hr/>
Total	<u>156</u>

It may be added that there are 61 resident birds in the Archipelago in addition to those enumerated above, so that the total number of species known from the Canary Islands is now 217.

¹ The birds of the Canary Islands are dealt with fully in a paper which I published in the *Ibis*, 1919, pp. 84-131; 291-321; 457-95; and 1920, pp. 97-132; 323-60; 519-69.

In an Archipelago which is visited by 54 regular migrants, 30 occasional visitors, and no less than 72 rare stragglers in addition to the resident species, it is easy to understand whence the present bird population sprang, and to guess how the endemic forms commenced to get a footing on the Islands. A glance at the species which constitute the resident birds to-day fully bears out the theory.

The Archipelago is undoubtedly in the regular line of flight of a large number of European species which winter in Africa. I have not the slightest doubt but that the Eastern Islands—especially the outlying islets lying nearest to Africa—afford a resting-place for a very much larger number of migrants than have ever been recorded. When we add to this the fact that the Canaries, like the Azores and Madeiras, though to a less extent than the former, are often visited by violent storms, and that every storm brings with it some straggler from Africa or a wanderer blown out of its ordinary course whilst on migration, we have the key to the solution of how the bird population of the Canary Archipelago arrived in the first instance.

The birds of the Canary Archipelago—with their South European affinities and strikingly modified forms—are just such as we should expect to find inhabiting islands which have never been joined to the mainland, and which have been compelled to rely on storms, regular migratory movements, or successive invasions to people them with birds.

We will briefly review the other land fauna of the Archipelago. There are no small terrestrial mammals or marsupials with the exception of Rats, Mice, Hedgehogs and Rabbits, all of which have doubtless been introduced at one time or another. Of these four, the most interesting is certainly the Hedgehog, which

was recently described as a new race¹ from a specimen which I obtained in Fuerteventura. Whether the Hedgehogs of the Western Islands belong to this same race has not yet been proved, for although there are certainly Hedgehogs in Gran Canaria and Tenerife, and probably in other of the Western Islands, yet none have been brought to Europe for comparison.

Mr Oldfield Thomas of the British Museum named the Fuerteventuran species *Erinaceus algirus caniculus*, and described it as "similar in essential characters to true *algirus*; but while true *E. a. algirus* of Morocco and Algeria is comparatively dark above and partly or wholly dark below, and *E. a. vagans* of the Balearic Islands (and Spain?) is light above and wholly white below, the present form is even lighter than *vagans* above, but its face and lower surface are partially brown, as in *algirus*." The Hedgehog from the African coast opposite is not yet known, and may of course prove to belong to this pale form. How the Hedgehog found its way from the almost entirely unknown region of the opposite African mainland it is difficult to say, and at first sight would seem to uphold the theory of former land connection. It must not be overlooked, however, that fishermen from the islands occasionally land on this forbidding and unexplored coast, but as they are, with good reason, in deadly fear of the nomad Moorish tribes, they never venture inland. The Canarian Hedgehog may, however, have been introduced in this way. If *E. a. vagans* is indeed found in Spain, I incline to the view that the Fuerteventuran Hedgehog is descended from this form, as it may easily have been carried in merchandise from Cadiz or other of the Spanish ports; the dry climate and desert

¹ Oldfield Thomas, *Ann. and Mag. of Nat. Hist.*, Series 8, vol. xvi., p. 152, August 1915.

conditions have acted on the Hedgehog in the same way as we have seen them act upon the birds, and a pale desert geographical race has thus been evolved. Would that we could discover when the Hedgehog had first been introduced into the Eastern Canary Islands.

The Rabbit of the Islands belongs to the South European form, *Oryctolagus caniculus husleyi*. It cannot be said to be by any means plentiful in any of the Islands, and is very seldom seen. It is "hunted" by Spanish sportsmen (!) who sally forth accompanied by a mixed "pack" of assorted mongrels, and armed with old muzzle-loaders of very antique pattern.

It remains, therefore, a striking fact, and one which strongly controverts the theory that the Islands have ever been joined to the African continent, that the only non-introduced mammals are *those which can fly to the Archipelago* from the mainland, *i.e.*, members of the family Vespertilionidæ or typical Bats.

There are four different Bats recorded from the islands: I have obtained two species myself, of which one, *Pipistrellus kuhli*, Natt., is a common South European and North African species ranging eastwards to the borders of India. Specimens of this Bat were obtained in Gran Canaria at Tafira (1080 feet) and in Fuerteventura at La Peña (50 feet). The other, *Pipistrellus savii*, Bonap., is rarer than the above but has a very similar range, at least as far as Palestine. Specimens were obtained in Gran Canaria at Las Palmas (sea-level).

Pipistrellus maderensis, Dobs, is recorded from Palma; this is a Madeiran species which has with this one exception never been recorded elsewhere.

Lastly, *Plecotus teneriffæ*, B. Ham.—a Long-eared Bat—has been described in 1907 from the island of Tenerife.

A third species of Bat (other than *P. kuhli* or *P. savii*) inhabits the island of Gran Canaria, having a very different flight from either of the above-named forms. Of the four races recorded from the Islands, one is obviously a straggler from the neighbouring island of Madeira, one is peculiar (apparently) to the island of Tenerife, and, it must be assumed, has been resident there for centuries, while the other two are well-known South European and North African forms.

Thus the mammalian fauna of the Canaries, both from what it possesses and what it lacks, bears out the conclusions at which we have arrived through studying the avifauna of the Group.

Reptiles and Batrachians are represented in the Islands by a small green Frog (*Rana esculenta*, var. *ridibunda*) and a Tree-frog (*Hyla arborea*); three forms of Skinks — *Chalcides ocellatus occidentalis* in Fuerteventura; *C. viridanus viridanus* in Tenerife, Gomera, and Hierro; and *C. v. sexlineatus* in Gran Canaria. Two Geckos — *Tarentola d. delalandei*, confined to Gran Canaria; and *T. d. bœttgeri*, inhabiting Tenerife, Palma, Gomera, and Hierro. The following Lizards are known from the Western Islands—*Lacerta galloti galloti* (Tenerife), *L. g. palmæ* (Palma), *L. g. gomeræ* (Gomera), and *L. g. cæsaris* (Hierro): these well-marked geographical races of *L. galloti* are of particular interest, as they show similar differentiation to the Tits and Chaffinches. Another Lizard, named *Lacerta dugesi*, inhabits Tenerife, but the most remarkable of all is the Giant Lizard (*Lacerta simonyi*) [*cf.* page 4], confined to the Roque Zalmore, an exposed group of rocks lying off the island of Hierro. The male of this Lizard measures $21\frac{1}{2}$ inches in length, and the female $17\frac{1}{4}$ inches. Still another large Lizard (*L. stehlini*) inhabits some rocks off Gran Canaria, but is considerably smaller. Snakes are unknown in the Canaries.

PART II

TRAVELS AND ORNITHOLOGICAL EXPEDITIONS IN THE WESTERN CANARY ISLANDS

CHAPTER VII

FIRST IMPRESSIONS OF TENERIFE AND GRAN CANARIA— A JOURNEY INTO THE HEART OF THE CUMBRES

IN these days of extensive ocean travel, how many hundreds of voyagers have broken the monotony of the sea trip to the Cape at the ports of Las Palmas or Santa Cruz—the capitals of the two most important islands in the Canary Archipelago; and yet how few know anything of the fascination or colour of these truly-named “Fortunate Isles.” To a traveller with a love of science, whether zoology, geology, botany, or anthropology, or with a taste for geographical research in almost any form, the Canary Archipelago is a veritable paradise; nevertheless, not many people know the Islands well enough to appreciate the real Canarian atmosphere.

I well remember the first view I had of Puerto Santa Cruz, as the anchor-cable rattled down and the ship swung round at her moorings. The grandeur of the mountain-chain, which stretches to Punta Anaga, the quay with the mule and ox-carts laden with fruit-boxes, the ugly white buildings of the town, capped by the Quisisana Hotel on the hill-side, the noisy crowd of Spaniards on the wharf, and the busy scene in the harbour, all go to make up one of the most picturesque scenes my eyes have ever fallen upon.

In company with several other passengers from the ship, I made a short excursion to Laguna, that

ancient township lying about 1800 feet above Santa Cruz. An atmosphere of Old Spain pervades the town, which is built on a fine alluvial plain in the hills.

Time seemed to have stopped at Laguna, and as we wandered between white-walled houses and loitered in shady *plazas*, we caught pleasant glimpses through beautifully-carved doors of old Spanish *patios*, where cool fountains played and the rays of the sun seldom penetrated. On the outskirts of the town, the sails of a curious old *gofio* mill slowly revolved, grinding the roasted maize, which forms the staple food of the islanders. (See accompanying illustrations.)

As we wended our way beyond the houses, we passed sturdy peasant women wearing tiny straw hats perched over their foreheads, bringing produce from the country. Some were driving little donkeys well laden with vegetables, or kegs of wine slung on either side of their panniers. Other women balanced huge baskets on their heads filled with live fowls or kids which, tied by the legs, gave forth piteous cries as they were swayed from side to side. A shepherd was returning from his flocks, and we remarked with interest the curious blanket-cape which he wore, and which enveloped him from head to foot. This is a garment peculiar to the country folk of these islands.

I was then on my way to the West Indies, and paid only a fleeting visit to the island, but the impression I received was a lasting one, and I vowed I would some day return.

Several years later, in 1910, while waiting for a ship to take me to Brazil, I again found myself in Laguna, with ample leisure to roam about and enjoy more fully the delights of this ancient capital.

There is a chapel here attached to an ancient Convent, where once in a hundred years the public



On the Outskirts of Laguna, Tenerife.



Laguna, the Ancient Capital of Tenerife.

are admitted to a celebration of the High Mass served by Trappist nuns. It was during this visit to the island that my wife and I were so fortunate as to witness the ceremony. We had dropped by chance into the little church to rest and shelter from the heat of the midday sun; the service had just commenced, and the air was already heavy with incense, as the nuns, all dressed in white, slowly filed into the choir behind the heavy iron grille. The shadowy forms behind the grille, the High Altar with its many lighted candles, the sweet voices of the nuns, and the deep reverence of the congregation—few in number and garbed picturesquely in sombre black, all kneeling by the grille—made up a scene which has lingered long in my memory—a scene, moreover, enriched by the perfect harmony of its surroundings.

It was not until four years after my first visit that the real opportunity for which I had been waiting occurred; news came to the British Museum that a remarkable bird, closely allied to the famous Blue Chaffinch of Tenerife, had been discovered by an Austrian in the island of Gran Canaria.

The Museum was badly in need of specimens, so as I had intended spending the winter abroad, I arranged my plans accordingly, and determined to pay a flying visit to the island home of this mysterious bird.

Sailing from England on one of the Union Castle boats on the 12th December 1908, we reached Las Palmas—the main port of Gran Canaria—a week later, after an exceedingly rough voyage.

Well do I remember that morning! We sighted the island, which appeared as a blur on the horizon, early in the day, and as we drew near, the sun lit up the farthest peaks of the mountains which stood out sharp and clear against a cloudless sky. The sea

was of an almost indescribable blue, which threw up vividly the barren slopes of the Isleta, those curious conical hills rising abruptly from the waves at the northern apex of Gran Canaria, and which are joined to the main island by a belt of drifted sand. Very soon after we dropped anchor, innumerable small boats and launches were seen making their way towards us, and although we were lying about a mile outside the shelter of the breakwater, we were soon surrounded by a clamouring set of Spaniards, eager to exchange their great variety of merchandise for our good English silver. Lace (Tenerife and Palma work), live canaries in cages, basket-chairs, and all manner of fruit and vegetables seemed to constitute the chief articles for sale, and a brisk business was soon being done.

The noise was inconceivable; the men in the boats shouting their wares, "diving-boys" in all stages of undress frantically beseeching the passengers on the liner to fling coins into the water, the shrill whistles of the many tugs which seemed to be bent on drowning every other sound, and of upsetting the rowing boats, as their owners pushed and jostled their way to the gangway of the ship. It was a very gay scene, highly typical of a foreign port, and I remember the astonishment with which my eye lit on two pretty English girls sitting quietly in their tug, dressed all in white, and accompanied by a dainty little girl of four, a very peaceful note in the midst of such apparent chaos.

The town of Las Palmas lies at some distance from the port, which is built under the shelter of the Isleta, and is connected with the town by a long and very dusty road. Most of the English residents live midway between the town and the port, and the Santa Catalina Hotel, then renowned for its delightful garden, is also



The Isleta and Puerto de la L...



The Anaga Promon...



Las Palmas, Gran Canaria.



Santa Cruz, Tenerife.

situated there ; but this part of Gran Canaria is too well known to need detailed description.

In Las Palmas itself a very fair museum is well worth a visit, if only to see the fine collection of skulls, mummies, and other relics of the Guanches, the aboriginal inhabitants of the island, of whom mention has already been made in a previous chapter. The collection of mounted birds is poor in the extreme ; unfortunately, many "foreigners" have found their way in among a certain number of undoubted local forms. None of the birds are scientifically arranged, and very few are labelled, so that the collection is practically worthless. I remarked two specimens of the Fuerteventuran Barn Owl and a Spoonbill, the latter labelled "Puerto de Luz, 21 Oct. 1880," also a Peregrine Falcon, the same which Canon Tristram mentions having seen in this museum in 1888.

On this, my first visit, I spent little time in Las Palmas, for having procured a disreputable-looking Spanish guide and two highly respectable mules, I set off on the 21st of December on my first memorable journey to the interior. Of Spanish I knew none, and my guide had been selected for his unrivalled knowledge of the mountain-paths and not on account of his linguistic attainments, which were *nil* ! From the moment we left Las Palmas we began to climb, and, excepting for occasional short cuts up the sides of the hill, kept to the main road, which is followed by all tourists to the Monte.

As soon as the town is left behind, the road passes through endless banana plantations, past running *açequias*, where the women, standing up to their knees in water, wash clothes from morning till night, spreading the clean linen to dry on the cactus. Canarian Grey Wagtails are always to be seen running

fearlessly along the *açequia* walls close to the washerwomen ; indeed, so tame is this pretty little bird that it is known locally as the "*Lavendera*," which is the Spanish for washerwoman, and it is looked upon by the islanders much in the same way as our redbreast is in England.

Our way led past the hill of the cave-dwellers, finally winding over the barren waste hills immediately overlooking the town. To a naturalist the country seems almost devoid of life, save for the little Berthelot's Pipits and the numerous lizards which dart from the side of the road and scuttle into their holes beneath the loose, dry earth.

The mules plodded gamely on, occasionally leaving the main road, apparently of their own free will, and, with their noses almost touching the ground, took short cuts up a precipitous rocky way which they evidently considered a path. The country here is terribly barren, the earth dry and cracked, strewn with loose stones and lava, sparsely covered with bushes of Euphorbia, of which *E. obtusifolia* seemed to be the commonest form. The Canary Islands are the home of a great many species of this most interesting genus ; in fact Messieurs Pitard and Proust enumerate some twenty-six species, and of these eleven different kinds have been found in Gran Canaria alone. Only in the valleys is there any sign of green. They are generally cultivated with bananas, while clumps of the date-palm (*Phoenix canariensis*) are usually to be seen near Spanish homesteads, lending a semi-tropical effect to this rather desolate scene. Naturally, my eye was always on the alert for any form of bird-life, and though in actual numbers birds were scarce, yet the species were of great interest to one straight out from England.



A Water-tank on the Monte Road.



A Well-watered *Barranco* in Gran Canaria—Palms and Banana Groves.

As we passed along the dusty road flocks of Madeiran Rock Sparrows would occasionally start up from their dust-bath, the white blotches at the tip of their extended tail-feathers showing up most conspicuously when on the wing, whereas they would become almost invisible the moment they settled on the ground. A Canarian Kestrel came into view, hovering with outstretched wings over the *barranco*, on the look-out for lizards, upon which it largely feeds. There are two forms of the Kestrel inhabiting the Canary Archipelago; the subspecies already mentioned is found in the Western Islands only, while its place is taken in the Eastern Group by a closely allied form.

We mounted higher and higher, and turning in our saddles, obtained a fine view of the coast and Isleta, the latter appearing almost as a separate island, so nearly is it surrounded by sea.

Travelling in the Canaries is a constant joy to one fond of colour effects, for the clear atmosphere lends itself to surprisingly beautiful tones of light and shade. Even the bare hills take on a thousand hues of browns, purples, and deep greens, as the shadows of passing clouds lend infinite colour to the landscape. Far over the opposite hill-side two large birds were soaring, one looking snowy-white as the sun caught its plumage, the other sombrely coloured, its dull brown garb appearing very dirty compared with its companion. These were Egyptian Vultures, not male and female, although they appeared almost similar in size, but an old bird in company with a bird of the preceding year, which had not even begun to assume the white plumage of the adult. The Egyptian Vulture is a resident in most parts of the Canary Islands, and is evenly distributed throughout Gran Canaria, where its scavenging habits constitute it one of the most useful of

birds and even afford it protection by the Spanish Government.

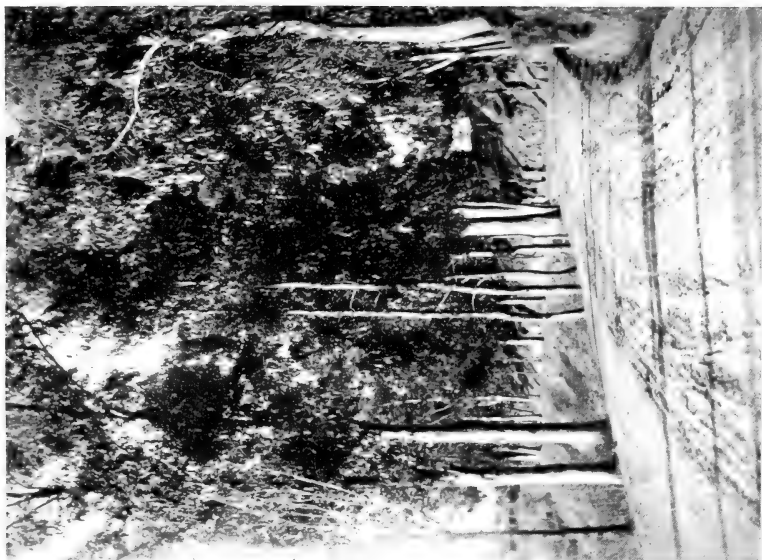
The Monte road becomes more beautiful as it ascends, and when Tafira—the little village standing over 1000 feet above the sea—is reached, the character of the country begins to change. Vineyards appear on all sides, while fig, peach, almond, loquat, and orange trees become plentiful, besides a host of other less known trees and shrubs. The dusty road is lined with fine eucalyptus trees, which continue to give their welcome shade as far as the village of San Matéo, where, in the days of which I am writing, the road ended.

At midday it is very hot riding, even in December, but the road is always interesting and one is seldom lonely. Groups of Spaniards, in their black sombreros, leisurely climb the hill, helping themselves along by hanging on to their mules' tails; others coming downhill pass with a cheery "*Adios!*" singing as they go, when suddenly round a hair-pin bend in the road comes the *coche* from San Matéo, a four-wheeled *tartana*¹ drawn by four little mules at a fast trot; women carrying huge hampers of fowls on their heads stand aside to let the *coche* pass, and get half smothered in a cloud of white dust as the lumbering vehicle rolls by.

The best mules in the island are owned by a firm of fruit exporters, and their huge carts, usually drawn by a team of six mules, are constantly passing up and down the Monte road, the drivers cracking their heavy whips and urging the animals on with loud cries.

Most of the islanders keep goats and chickens, and whenever a village is reached the road is sure to be full

¹ A vehicle peculiar to the Canary Islands, with either two or four wheels.



The Monte Road lined with Eucalyptus Trees.



Bamboos and a Typical *Aequia*.

of children in all stages of undress, sometimes quite naked, with their little bodies tanned a deep brown. The good aroma of roasting coffee-beans mingling with the smell of garlic in the cooking dinner greets one's nostrils as one passes the open doors, and invites one to dismount and rest awhile.

As we neared the Santa Brigida Hotel, which is generally the furthest point reached by visitors from the ships, we saw that the country was closely cultivated and every inch of ground used up; barren vines covered most of the fields, and Indian maize and sugar-cane are extensively grown. A great feature all over the island is the way in which the hill-sides are cultivated in terraces wherever possible; the ploughing is usually done by oxen, and the plough used is of the most primitive kind. This method of terracing calls for a special system of irrigation: the water let loose from the tanks is carried either by hand or by a ditch to the uppermost terrace, where it is guided from furrow to furrow by a small boy, who blocks up the end of the furrow as the water flows along it; a small opening is then made to the next furrow and the water guided along this, and so on until the whole terrace is watered and the stream is diverted through a side ditch to the terrace below.

Away on our left we passed the Caldera, an almost perfect crater. It is said to be a thousand feet in depth. Birds now become more plentiful, and many species were recognised which were absent from the plains below. A flock of Brown Linnets rose from the vine-clad slopes and came sweeping towards us, settling in a body on a spiny hedge of aloes. Such a plant constitutes an obstacle to both man and beast, and is second only to the cactus when an impenetrable barrier is required! An island Blackbird suddenly emerged

from the undergrowth, and followed by his mate dived into a mulberry, a rare tree in the Monte, while on all sides the Dusky Blackcaps are singing from the shade of the loquat trees.

There are many other species to be seen if one dismounts and walks into the clump of pine-trees (*Pinus canariensis*) on the summit of the hill; Canarian Chaffinches and the Tenerife Blue Tits are here met with for the first time, though the latter may also be seen in the gardens of Las Palmas in company with dozens of Canarian Chiffchaffs, whose familiar note can be heard in most parts of the island.

Without exception all the six birds mentioned above are *subspecies* bearing trinomial nomenclature, for all are forms peculiar to the Canary Archipelago, and like so many birds which have their home in these Islands, have become slightly modified and differentiated from the parent race. It has been mentioned in a former chapter, where the question is discussed at length, that to such an extent has isolation played upon the avifauna inhabiting the Islands that there are no less than 42 species and subspecies peculiar to the Archipelago, and in several cases many of the islands contain their own particular forms.

A mile or so further up the road, which is lined closely with fine eucalyptus trees, we suddenly catch a glimpse of the village of Santa Brigida itself, picturesquely situated on a high knoll overlooking the Vega, the large fertile plain stretching away to the foot of the Cumbres. It was above the Vega that I first met with the island Buzzard, a speck soaring far up in the heavens. It is a small race, and is peculiar to the Canary Islands. When I first saw the Cumbres, which I later came to know so well, the sun had already begun to sink, the steep *barrancos* were



Santa Brigida, Gran Canaria.



In the Monte, Gran Canaria, 1580 feet.

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already plunged in shadow, and the highest peaks obscured by clouds, which slowly crept down the mountain-sides. Now that I am better acquainted with Canarian scenery, I know that the Cumbres never look twice the same ; sometimes they appear deep purple and their crests stand out clear and sharp against the sky ; at others, their rugged sides are suffused with a reddish glow, while often, in the winter, the mists roll down, blotting them entirely from view. In the evening, after a hot still day, the Cumbres lie bathed in a shimmering light, while over the Vega a white vapoury mist rises slowly from patches of freshly irrigated ground. Gradually, as twilight approaches, a peculiar pink glow creeps over the hill-sides, deepening in intensity as the shadows fall, finally fading away completely as darkness settles over the island.

As the sun sank lower we began the last part of our journey from Santa Brigida to the foot of the mountains, still keeping to the main road, which passes through the most beautiful country to be found in the island. The air is full of music, though the Canaries had long ceased singing in the eucalyptus trees. Trickling streams were heard on all sides, for there is no dearth of water at this time of year in the Monte, and every possible drop is caught and guided by means of cunningly built *acequias* to the water-tanks, where the precious fluid is stored up for the summer. We crossed an old stone bridge and drew rein to gaze into the gorge beneath, listening to the splash of the waterfall. The sides of the tiny *barranco*, at the foot of which the water ran, were thickly overgrown with ferns of many species, beautiful mosses, prickly pears, grey-green aloes, and a profusion of creeping plants. As we listened, a clear note rang out from the densest part of the foliage, though as yet the

bird remained hidden from view. Suddenly it flew across to the opposite side of the gorge and we caught a glimpse of the deep red chest of the Superb Canarian Redbreast, a subspecies confined to the islands of Tenerife and Gran Canaria; unlike our British "robin" this Canarian form is very retiring and must be sought for in the most sheltered spots, where its note will soon betray its presence.

As it was already growing dusk we remounted and were soon on our way again; the atmosphere was becoming perceptibly cooler, for we had already ascended some two thousand feet above the sea. Under the shadow of the eucalyptus trees it was already quite dark, and as we rode along the clatter of the mules' hoofs was almost drowned by the hoarse croaking of innumerable small green frogs; the cry of a Canarian Long-eared Owl broke in upon the chorus and for a moment the frogs ceased. My old guide chanted to himself in a mournful voice and pulled his *manta* close round his shoulders, for it had turned very cold. Another half-hour's ride and we reached the outskirts of San Matéo, the little village lying under the shelter of the mountains, where we were to spend the night. A damp mist enveloped the village, for in December the clouds descend to the very foot of the Cumbres every evening. The *fonda* where we put up is in the main street, and is fairly clean in comparison with most Spanish inns, and we were lucky to get a room. The first half of the night was spent in skinning my birds by the light of a miserable candle, and most of the remainder in listening to the old church clock tolling out the hours.

Soon after sunrise the following morning I awoke; the air coming in at the window still felt very chilly, and as I lay on my sheepskin bed and listened to the unfamiliar sounds from the cobbled street, I mused of

what the day might hold in store, of the Blue Chaffinch which I hoped to bring back with me, and of the many interesting and new birds which I should meet with. The thought of three still unskinned birds on the table lay rather heavily on my mind! And I there and then vowed that never in future would I leave birds unskinned over night.

A harsh croaking overhead caused me to leap out of bed just in time to see two fine old Ravens flapping their leisurely way overhead and fast disappearing in the mist, which like a white blanket was slowly rolling up the Cumbres, as the rays of the early morning sun warmed the air. The three belated birds were soon skinned and stowed away with the others, and while waiting for breakfast I sauntered out at the back of the inn to take my bearings. The village looked very different in the daylight, and I became aware for the first time of the fine chestnut woods which covered the surrounding slopes. Fig and almond trees abounded, and every inch of ground had been prepared for the heavy crops of cereals which in a few months' time would lend such a changed aspect to the countryside. The smell of burning fat and garlic reminded me that I had got up unusually early, and the plate of kid, swimming in grease, which was put before me, was not exactly what I should have chosen for breakfast, yet it had to be eaten, for an ornithologist who is not much of a linguist cannot always choose his fare.

Eventually my bill was paid, the kit was strapped on to one of the unwilling mules, and having mounted the other we ascended the village street in the direction of those alluring mountains. It was still early, in fact only 7 A.M., and riding was very pleasant. Our path took us alongside the deep *barranco*, on either side of which the chestnut woods grew, lending an unusual

aspect to the scene—I say unusual deliberately, for this is one of the last places in Gran Canaria where the chestnut woods still flourish.

The country immediately surrounding San Matéo, which village lies at an altitude of 2500 feet, is more prolific of bird-life than almost any part of the island. On a future occasion I spent a couple of days collecting birds here, in February 1912, and was quite astonished at the number of forms met with. Certainly, the vegetation from San Matéo up to 2800 feet is far richer than in many parts of the island, and this may largely account for the number of birds; the chestnut woods themselves were rather empty of bird-life with the exception of Canarian Chaffinches, but here and there a few large Canarian pines (*Pinus canariensis*) had found their way into the wood, and on these trees Tenerife Blue Tits and one or two Chiffchaffs were usually to be found. Beyond the village many fields were cultivated with beans, while thick crops of corn were a particular attraction to immense flocks of Brown Linnets. Thanner's Corn Buntings were in numbers, both singly and in flocks, their unmusical wheezing note resounding from the fields and orchards. These Buntings, of which I obtained a number in my February visit, were all representatives of that species which is confined to the high ground in the island; and as a matter of fact, when in after years I compared a large series of Buntings shot in Gran Canaria, I found that almost without exception the birds obtained in the mountain districts were larger and had darker underparts than the birds shot on the coast. This is a problem to which I have not yet found a satisfactory explanation, but which will be found more fully discussed in the pages of the *Ibis*.¹ Noisy Spanish Sparrows were invading the fields in hundreds, and rose

¹ 1912, pp. 610-613; 1914, pp. 240-243; 1919, pp. 107-109.

in a solid mass at the report of my gun ; a big flock of Lesser Goldfinches which we disturbed feeding in a patch of beans rose as we passed, a cloud of red and gold, the sun catching their bright plumage as they flashed by and settled on a hedge of aloes. Kites were busy hunting the sides of the *barranco*, where in the deep overhanging vegetation several birds are found which otherwise are seldom met with : chief of these is a songster we have already come across once in a like situation, the beautiful island Redbreast. Hidden away in a wealth of undergrowth, many secluded nooks and crannies may be found, the walls of rock covered with damp mosses, creeping plants, ferns and brambles, all wet with the heavy mists which nightly envelop these solitudes. Here the Canary "robin" lives secure, surrounded and guarded from intruders by almost impenetrable prickly pears, and pours forth its sweet song in company with the Blackbird, Chiffchaff, and Blackcap, birds that may call this paradise their own. The deep *barranco* above San Matéo must be a veritable El Dorado to a botanist, but enough has been said without enumerating a long list of shrubs and plants which must be seen to be thoroughly appreciated.

Away down at the foot of the ravine lie hidden ice-cold pools of water, and there may be found the Canarian Grey Wagtail, that pretty, confiding bird which we already noticed running along the *açequias* amongst the washerwomen of Las Palmas. Wherever a pool or tank of water is to be found, there surely will this little Wagtail be also. It is one of the most familiar birds in the island, and I felt nothing short of a murderer when I added a beautiful pair to my collection. The reader may possibly be weary of the enumeration of so many birds, but we have been passing through a very fertile district for the ornithologist, and soon we

shall search the horizon for any sign of a bird, with the exception of an occasional Vulture or Kestrel.

Our path led across the *barranco*, and we then followed its course until we began to leave cultivation behind, when, as if to mock us, the call of a Quail fell clearly on our ears from a bean-field down below. This species we had not yet met with; in later years I learnt that it is very plentiful in the fields of this neighbourhood, but without dogs very difficult to flush. Shooting over this ground in February 1912 we succeeded in putting up several. The distribution and status of Quails in the Canary Islands are other problems which require more material before they can be finally settled, and which at the present time are better not discussed in these pages. The migratory movements are not properly understood and there are apparently two forms living together in the Islands. Dr Hartert of the Tring Museum has recently reviewed the genus in the pages of the *Novitates Zoologicae*, 1917, and has named the Quails *resident* in Madeira and the Canary Islands *Coturnix coturnix confisa*.

Much valuable time had already been wasted, for we had a long way to go and we soon began to climb in earnest. Raptorial birds now claimed my attention: Egyptian Vultures and Kites were soaring overhead, and a Buzzard also caught my eye as it sailed along the face of a precipice far out of reach of my .410 bore gun. A shot off the back of the mule brought down a fine old male Kestrel with the head and tail feathers a beautiful pale slate-blue, the latter broadly banded at the extremity with blue-black. We soon left all sign of cultivation behind, ascending until my aneroid registered 5500 feet. Birds became scarcer as we rose; Grey Wagtails were seen up to 3500 feet constantly flitting across the path; a little higher still, two Corn Buntings were noticed and

one secured, but the commonest birds of all were the little Berthelot's Pipits, which were noted up to 5300 feet.

Our destination was the high pine forest above San Bartolomé, and all this time we had been heading due south. At the highest point we drew rein to rest our mules and admire the view—one of the finest in the world to my mind—for towering far above us, across what appeared to be only a few miles of deep blue sea, rose the snow-clad Peak of Tenerife glittering in the brilliant sunlight. From this elevation the island of Tenerife created the most remarkable effect. In reality, the nearest point lies thirty-seven miles from Gran Canaria, but from the high ground upon which we stood it appeared but a stone's-throw away. The lower part of the island was then entirely obscured by a cloud belt,¹ the mountains appearing actually to be resting on the clouds, their rugged slopes surmounted by the dazzling white Pico de Teide towering over 12,000 feet into the sky.

We were now coming out on to what seemed to be a stony plateau, very barren and forbidding; the mule track could hardly have been worse, at times being practically impossible to detect, but the mules never hesitated, picking out the path with unfaltering eye. There was hardly a sign of vegetation, nothing but bare rock and parched-up earth, although this was the wettest season of the year. We were now on the highest ground traversed, and left the Roque Nublo (6110 feet) on our right, bearing in a south-westerly direction and passing not far from the highest points in the island—Los Pechos—which attain 6400 feet, according to the latest maps of Gran Canaria. Rather

¹ This cloud belt is caused by the moisture-laden air from the sea rising and becoming cooled as it reaches the higher elevations. It then condenses and the cloud belt is formed.

abruptly we reached the head of the Paso de la Plata, and as we stood at the summit of this precipitous path one of the grandest panoramas imaginable lay before us: facing as we did due south, we looked over an extensive range of mountainous country, and at last the pine forests lay before us. Below our feet the great Barranco de Tirajana seemed almost to act as a barrier to the pine growth, for west of this *barranco*, ridge upon ridge seemed to be covered with pine-trees as far as the eye could reach, whereas north of the *barranco* hardly a pine appeared. Far down again below the pines, and a little to the east, lay the village of San Bartolomé, while beyond the pine-clad ridges the sea lay like a sheet of blue fading away to Fuerteventura in the dim distance. The mountainous southern neck of this island can be seen on a clear day from Gran Canaria, though about fifty miles distant.

We had a short rest here at 5500 feet and shot another fine old Kestrel which obligingly perched on a rock near by. The descent by the zig-zag path was very steep, and we dismounted and led the mules most of the way. Four Ravens flew out from the overhanging cliffs as we passed, and several Egyptian Vultures were soaring like tiny specks in the sky. The country became more fertile as we descended, and I managed to shoot one bird out of a flock of small Finches which rose like a flash and disappeared over the edge. As we were still at a high elevation I was surprised to find any of the Finch family here at all, and anxious to identify the species; after much hunting and scrambling the bird was at length retrieved and proved to be a Canary, to my astonishment, as I had not expected to meet with these birds except in the cultivated districts. Signs of human life gradually began to show themselves; here and there a field had been ploughed

by a couple of oxen, literally out of the precipitous side of the mountain; a flock of Rock Pigeons dashed out from the crevices of the cliffs overhead, and went wheeling and twisting over the village below. Kestrels were plentiful, and as we neared a farm the noisy Spanish Sparrows soon attracted our attention. Our object was to reach the pines with as little delay as possible, so several species were, I know, then overlooked which I have since seen in this neighbourhood. We at last gained the outskirts of the pines, and as we were then unable to find any semblance of a path we struck out for ourselves over some terribly rough stony ground, and soon found ourselves fairly amongst the pine-trees.

My hopes now ran very high, but as we scrambled along they gradually sank lower and lower. Never had I been in such deserted woods! As we drew rein to listen, the silence was intense: a pine-cone falling through the branches sounded like a rock bounding down a mountain-side. The atmosphere was extraordinarily clear, and in these deserted woods sounds travel a great distance, as we discovered in after days. My old guide grunted and waved his hand further on, but I had no wish to spend the night in the forest and we sadly retraced our steps.

Knowing the "Pinar," as I do now, I realise that I was truly unlucky in not meeting with any sign of bird-life at all, for curiously enough we never even came across a party of Tenerife Blue Tits, much less the mythical Blue Chaffinch! In reality these woods hold some extremely interesting birds, but of these more will be told later. My idea had been chiefly to "spy out the land" for future trips, and I quickly realised that a camp in the forest was absolutely essential to success. The woods looked anything but promising

at my first inspection ; the trees had been sadly thinned by the improvident charcoal burner, but covered a much greater extent of country than I had been led to believe, stretching, as I have already said, over most of the hilly country on the south-west of the island.

Of the ride back to San Matéo there is not much to tell ; we followed much the same paths and I did little or no collecting ; the old guide knew the Cumbres as few could have done, and I now suspect that he was once a *contrabandista* who lived by his wits, and his knowledge of the interior must have often proved his salvation. It was after dark when we again reached San Matéo and the mists had already wrapt the village in a ghostly white mantle : the cobbled street was quite deserted, and it might already have been midnight but for the sounds of a guitar which an unseen minstrel was strumming.

Having many birds to skin, it was eleven o'clock before we left the following morning, my plan being to cross the highly cultivated land which lies between San Matéo and Teror, and from there, if the country looked promising, to make our way to Firgas, returning to Las Palmas by the main road.

I do not propose to give more than a rough sketch of the country through which we passed. The birds we encountered were for the most part of the same species as those seen in the district between San Matéo and Santa Brigida. The country traversed was, if possible, greener and more cultivated than any I had yet seen, and in the spring months is truly beautiful. Every imaginable tree seemed to flourish here ; the majority were quite new to me, but a great variety of fruit trees were passed. I should think it would be hard to mention any plant which would not thrive in the fertile soil of this altitude, and in conse-

quence birds were very plentiful—Canaries, Blackcaps, Chiffchaffs, Linnets, Spanish Sparrows, Grey Wagtails, Berthelot's Pipits, Blue Tits and Goldfinches, were all noted in turn, besides all the raptorial birds which we had encountered on the previous day. It was during this ride that I met with a bird which is only a very rare visitor to the Archipelago; it was certainly an eagle, probably the Sea Eagle (*Haliaëtus albicilla*), which had flown over from the neighbouring African coast, and its large size immediately attracted my attention as it soared overhead. In all my travels in the Islands, I have never come across this or any other eagle again.

I spent much time in collecting on the journey, and the evening was far advanced when we obtained our first view of Teror. The descent from the high ground to the main road just below the village itself was the steepest we had yet encountered, and took much time, our mules picking their way most gingerly and needing continual prodding to keep moving at all. When we struck the road a short distance below the little township, it was already six o'clock, heavy clouds were rolling up, and as it looked as if the weather was going to break badly, I decided to return the same night to Las Palmas. No pines were to be seen at all, and from what I could learn there were none in the neighbourhood of Firgas, so I concluded there was very little chance of meeting with the Blue Chaffinch in this part of the island. I had now quite made up my mind that the bird I hoped to obtain must be sought for in the thickest pine forests which clothed the south-western ridges.

Our mules were nothing loth to find a firm, well-made road under their feet, when, as darkness settled over the island, we turned their heads in the direction of home. The scenery in this part of Gran Canaria

is particularly fine, but on this, my first visit, I saw practically nothing of it, as most of the ride was in total darkness, the storm-clouds driving up and almost obscuring the moon save for an occasional fleeting glimpse, when the landscape was lit up as if by a flash of "summer lightning." The mules were both weary, and riding in the dark became very tedious, the monotonous chanting of my companion—he invariably commenced to sing to himself as soon as darkness fell—and the harsh croaking of the little green frogs from the water tanks, being the only sounds which broke the stillness.

We had been riding for about an hour when we left the main road, and shortly afterwards my guide pulled up in front of a small wayside *fonda*, which seemed in the darkness to be quite isolated from other buildings, standing alone on the mountain-side. The Spaniard made signs that he wished to eat and drink, and knowing that he had had nothing all day save a little *gofio*, I held his mule while he went into the *fonda*. Bitterly did I regret my short-sightedness. After waiting for some time I hitched up the mules and entered the inn myself, to find the old fellow quite incapable of walking or riding another yard. I quickly decided to push on and leave him to recover at leisure, if I wished to get back that night. The rest of the journey was anything but pleasant. Knowing not an inch of the way I did the only possible thing, gave the mule his head and trusted to his sagacity to take me to Las Palmas, which luckily was his home as well as my destination.

It was very eerie riding in the pitch blackness, knowing not whither my mule was carrying me; now and then a lonely figure would start up as if from the earth itself and silently glide along by my side, dis-

appearing into the night as suddenly as it appeared. I soon began to understand the feeling which had prompted my old guide to chant to himself as soon as the shadows began to fall, for even the sound of one's own voice is comforting on a long night ride!

Eventually the lights of houses near Confital Bay came into view, and at last, after several hours' riding, I found myself in the dimly lit streets of the Puerto de la Luz. The mountainous form of the Isleta loomed heavily in the foreground, and from the summit the lighthouse lantern threw its flashing beams far over the restless sea.

In the spring (April) of the following year (1909) I again visited Gran Canaria and made another expedition in company with three of the British residents in the island, this time following the main road to the south of the island, passing through Telde, Ingenio, and Agüimes. We stayed for several days in the village of Tirajana, and from there worked the pine forest in the immediate neighbourhood. I did not expect to meet with the Blue Chaffinch in this district, but nevertheless we all kept a sharp look-out for the bird, which, however, never came our way.

I shall not attempt to describe this trip in detail, as the pines were practically on the same ground as we had searched the year previously, and nothing new was seen of exceptional interest, save the island form of the Red-legged Partridge. The road traversed will be seen on the map of Gran Canaria (facing page 50), and should certainly be followed by anyone wishing to gain the interior of the island in the shortest possible time. Though nothing like so fascinating as the journey over the Cumbres, the road is not without interest, and from Ingenio to Tirajana passes through wild, impressive scenery.

CHAPTER VIII

IN SEARCH OF THE BLUE CHAFFINCH OF GRAN CANARIA —AN EXPEDITION TO THE PINE FORESTS

Two years had gone by since news had been received that a Blue Chaffinch lived "somewhere" in Gran Canaria, and during my hasty visits to the island I had not located its habitat. I had seen enough, however, to be pretty sure that if the bird existed at all it must be sought for in the thickest part of the "Pinar Pajonal," and before leaving England I mapped out a programme which included camping in the heart of the "Pinar." Owing to the kindness of Mr Maurice Blandy, who accompanied me, a fine tug was placed at my disposal as we had this time agreed to approach the pines from the south, sailing exactly half-way round the island and landing at an insignificant "port," from which the "Pinar" could be more easily reached.

We boarded the tug *Britannia* on the 21st of January 1910, and at midnight steamed out of the harbour on the first part of our journey. The lights of the Club Nautico were twinkling across the water, for a dance was in progress, and the strains of the band floated out to us as we threaded our way between the dark hulls of many ships lying at anchor in the harbour. It was a beautiful night and the sea was quite calm, and we all turned in immediately to get what sleep we could—the rhythmical throb of the engines and gentle

lap of the waves against the tug soon producing the desired effect.

We awoke next morning at the break of dawn when the east was slowly turning pink and lighting up the coast, which consisted of rather low rugged cliffs. A break in the coast-line showed us a wide *barranco* leading away from the beach in a north-easterly direction. A pair of Ravens was noticed almost as soon as it was light flying along the face of the cliffs, but otherwise the landing-place seemed deserted of bird-life at this early hour; on our return journey several Yellow-legged Herring-gulls, and a single Black-backed Gull (probably *Larus fuscus affinis*) were noted here, but none obtained.

We went ashore in a large boat which we had towed behind us, and thanked the gods that the sea was so smooth, as otherwise landing on this stony beach, with a heavy surf running, is a very ticklish undertaking, if not an impossibility. This time our luck was in, and soon after 5 A.M. we found ourselves on *terra firma*. Two or three single-storied white buildings stood on the stony beach, and in these a consignment of fruit was stored waiting shipment in the little fruit steamer which (weather permitting) visits Puerto Mogan at intervals. The bales of fruit are then carried out into the surf on men's backs and tumbled into a heavy surf-boat which, when full, is rowed out to the schooner lying well out to sea away from the treacherous shore.

Our muleteers, with seven mules, engaged beforehand, were awaiting our arrival on the beach. We had each a riding mule and the other three were to carry our tent and baggage. After rather a long delay we left the coast at 7.30 A.M. We were surprised to find that one of our "muleteers" was a very quaint old woman,

who, throughout the long tiring climb in the glaring sun, stolidly smoked a pipe and balanced a heavy bundle on her head. The path led up the Barranco de Mogan and proved good until we reached the village of that name, picturesquely situated about three and a half miles from the coast. As we advanced, the valley widened out, and as we drew nearer to Mogan it became more and more cultivated. Large crops of tomatoes are grown here, and bananas are also extensively cultivated.

As we passed up the *barranco*, several flocks of Rock Pigeons were put up, and when we reached a more fertile part, small birds of many species became numerous—Chiffchaffs, Blue Tits, Grey Wagtails, Corn Buntings, Blackbirds, and many Canaries were noted in turn, and specimens of all these forms were collected. At length my eye fell on a tiny bird which I had seen near Las Palmas but had never yet obtained. At first sight it might have been mistaken for a Lesser Whitethroat, and indeed it has undoubtedly been confused with *Sylvia curruca curruca* by more than one early writer. Its habit of darting into the thickest part of a bush, where it creeps about in mouse-like fashion, proclaimed it to be a true member of the genus *Sylvia*. It was, in fact, the Spectacled Warbler (*Sylvia conspicillata bella*), a really beautiful little bird; the male in its spring garb is distinctly handsome with his white throat merging into grey and pink on the breast and belly, the dark grey cap and ear-coverts contrasting with the brown back and rufous edgings to the wing-coverts and primaries.

The Spectacled Warbler is a shy little creature, and when once alarmed flies some distance to a thick shrub from which it is particularly hard to dislodge it; in the hot *barrancos* near the coast it may be sought for in the Euphorbias (*E. balsamifera* and *E. obtusifolia*), etc.,

and when frightened it utters a peculiar little chattering cry unmistakably that of a Warbler.

Another interesting species of which several pairs were seen in this valley was the Canarian Grey Shrike, a bird which I had met with for the first time the year previously between Aguïmes and Tirajana. This Shrike is extraordinarily local in its distribution, and is entirely absent from the north of the island. It loves to frequent the almond groves of the sun-baked villages in the south of Gran Canaria, and from its perch on the topmost twig it keeps a sharp look-out for danger, uttering from time to time its musical whistle. On the 8th of April 1909, I had found a nest belonging to this Shrike, which contained five fully-fledged young, placed in the centre of a low bush on very stony ground, situated only a few yards from the main road. The Shrike and the Warbler were certainly the most interesting species we had yet come across in the Mogan valley, and, with the exception of Kestrels, Vultures, and Kites, all of which were constantly in evidence, I have given a complete list of all the species noted.

On our return journey down this same valley in the following month (February), a small flock of Trumpeter Bullfinches were seen close to the sea-shore. Of these interesting birds more will be told later, as I met with many during a subsequent trip when I had better opportunities of observing them.

We breakfasted just outside Mogan, a small village lying at the head of the *barranco*, and from here the path to the "Pinar" ascends very abruptly. For the next five hours we climbed steadily upwards, reaching the outskirts of the pines at about 1970 feet, according to a French aneroid which I was then carrying.

At about 2320 feet we passed over the top of the

ridge and almost immediately came upon a pair of Thanner's Great Spotted Woodpeckers (*Dryobates major thanneri*), which fell to a shot from Blandy. I was particularly interested in being able to handle this bird, as the Woodpeckers of the Canaries, like the great majority of the Canarian avifauna, are peculiar to the Archipelago and have a very odd distribution—as much for the islands which they do *not* inhabit as for the islands which they do. To begin with, there are two island forms, the one mentioned above, which is confined to the pine forests of Gran Canaria, and another subspecies, *D. major canariensis*, which is confined to the island of Tenerife. One would certainly expect to find one of these forms in the islands of Gomera and Hierro, but such is not the case, while the absence of any form of Woodpecker from the pine forests of Palma is quite unaccountable. Both *D. m. thanneri* and *D. m. canariensis* are easily distinguished from the typical European *D. m. major* by their darker underparts, while the race inhabiting Gran Canaria differs from the Tenerife bird in having the underside, as well as the brownish frontal-band, lighter throughout. It is easy to understand that their isolation in the Canary Islands has tended to give the insular forms darker underparts; but why the birds living in Gran Canaria should differ from those living less than fifty miles away in the pine forests of Tenerife, under apparently identical conditions, is much more difficult of explanation. Certainly the pine forests of Tenerife lie at a higher altitude than the pines of Gran Canaria, but this in itself would hardly tend to produce the differentiation which has taken place.

The Pines, when first we entered them, were only sparsely scattered, but some fine trees were passed. A short ride from the spot where we shot the Woodpecker

brought us to the Cueva de las Niñas ("The Caves of the Children"). Here we decided to remain, there being several reasons to recommend this as our camping ground: a small fresh-water stream, containing some good pools, ran at the foot of a tiny *barranco* close by—a great consideration when camping out anywhere in the Canary Islands; also we were within a few hundred yards of the Pine forest proper, where we could obtain firewood. As we pitched our tent on the summit of the knoll in which the caves were situated 3000 feet above the sea, we had an uninterrupted and magnificent view in every direction. Moreover, the caves, some of which were inhabited and half "built up," gave shelter to the men and beasts we had brought with us.

The view seen in the illustration facing page 186 was taken from the pine-clad ridge looking south, and the tent can be seen—a tiny white object—immediately to the left of a fine *Pinus canariensis* standing alone.

At this elevation a refreshing breeze was blowing, but in the sheltered *barrancos* the sun beat down mercilessly even at this time of year. On this occasion we were forced to borrow a tent in the island—not by any means an easy thing to do—but we managed to rig it up in the end, and prayed that it might not rain or blow too hard during our sojourn within! When camping in most of the Canary Islands it must be borne in mind that the ground is terribly hard, often full of stones, large and small, and in many parts covered with lava, so that it is no easy matter driving in tent-pegs. Wooden pegs are absolutely useless and split at once; steel are a great deal better, but iron are the best of all, and should be longer than those usually supplied, 12 to 14 inches for choice.

As evening approached and the sun sank behind

the mountains, it became very cold, and we soon turned in for the night, regretting that we had not brought a few extra blankets, as we had no camp beds. I took the precaution of scraping away the stones and hollowing out the ground on which I should presently lie, and so was fairly comfortable; but my companions, being of a less luxurious disposition, had thrown themselves down on the bare earth without troubling to "make their beds." I remember being awakened in the early hours of the morning by the movements of one of the party, who, not being over-blessed with natural covering, was laboriously folding up his pocket-handkerchief, to place under his hip-bone in case (as he solemnly put it) this part of his anatomy should have worn through his skin by morning! The tent was uncomfortably small for two, and as four men had to sleep inside it, we were huddled together like pigs in a sty, a condition which we came to appreciate better at 5 A.M., when the temperature dropped to 3° above freezing.

The following day, the 23rd of January, we were up early, and as we emerged from our cramped sleeping quarters a magnificent stretch of country lay before us, the clear morning air lending distance to the view. The sun was just peeping over the ridges, while the valleys were still dark in shadow, and the mists had not yet dispersed. A heavy dew lay on the ground and everything was soaking wet. Our men had collected a heap of fir-cones and were busily engaged in coaxing a fire, the smoke from which rose in a long wreathing column into the still morning air, for the breeze had dropped and not a leaf was moving. A giant pine (*Pinus canariensis*) stood, a lonely sentinel, on the summit of the Cueva, within a few yards of our tent, so we had not far to go on our first morning to find cones enough to boil our kettle.



The Cueva de las Niñas.



The Camp on the Outskirts of the Pine Forests.

As the sun rose, our spirits rose accordingly, for now we felt certain we had struck the right place in which to find the Blue Chaffinch, and that we should not again return empty-handed. The "Pinar" stretched as far as the eye could reach, clothing the ridges both to the north and east, and after breakfast we set out to scour the forest between the Cueva de las Niñas and Juncal, the ground still ascending and the trees becoming thicker as we advanced.

The whole day was spent thus, tramping in line through the forest, as though walking up Partridges, and continually listening for the note of the *Teydea*. One of our men, whom we took with us as guide, professed to know the bird well and to have seen it often in this part of the "Pinar," but our luck was again out, and we never so much as saw one in the distance. We carefully searched over miles of ground, ascending gradually to 3150 feet, and finally returned to camp by the mule path leading to Carrisal and Tejeda, which winds round the mountain-side, and here we passed some of the finest pine-trees we had yet come across. Woodpeckers were continually seen and heard; they are fairly plentiful in the "Pinar Pajonal" and are most conspicuous in flight when the white inner and greater coverts show up markedly; the light coffee-coloured underparts and the blue-black upperside with the large white blotches on the coverts, make this Woodpecker the most ornamental bird to be met with in the island. Having since had further opportunity of observing this species in Gran Canaria, I have come to the conclusion that it is not so shy as the other members of the genus met with, less anxious to place the tree trunk between itself and the intruder, and, in consequence, easier to watch. During the month of February, the "*Carpintero*," as it is called by the peasants, is always

seen in pairs, the female differing from the male in lacking the crimson band at the base of the neck—a character which it is usually impossible to note without close inspection. Its cry is very loud, and in these silent forests betrays its presence at a considerable distance; I noticed very few nesting holes, and have never taken the eggs.

As we walked through the forest we continually came across small parties of Tenerife Blue Tits, searching diligently for food and flying from tree to tree, the little band always keeping together and uttering a plaintive cry; in fact their call was often most disconcerting when we were trying to locate the note of a Chaffinch. I found these Titmice evenly distributed in the "Pinar," where I have seen them up to 4000 feet in some numbers; but they are not by any means confined to the pine forests and are common in most of the cultivated districts throughout the island.

One of the commonest birds to be found in these solitudes is the Canarian Rock Pigeon, but it is extraordinarily wary and seldom allows one to approach within gunshot. This was unfortunate, as it is very good eating and was always a welcome addition to the tinned food upon which we were largely compelled to exist.

The Kestrel was only a little less common here than in the valleys below, and we continually noted Egyptian Vultures and occasionally a Red Kite soaring high in the heavens.

We found scrambling through the forest on a carpet of slippery pine-needles a distinctly fatiguing business, and were all glad when we gained the camp, which had been in view for the last hour. A bath in one of the icy pools, a change into grey "slacks," and a pair of soft Madeira boots—the

most important item of a camper's outfit—made new men of us, and two of the party then sauntered off to get a partridge for supper. Unfortunately for our night's rest they succeeded, a skin was made of the bird, and the body flung into the "hot pot." The result was lamentable, and we came to the unanimous conclusion that we had shot the oldest cock bird on the island!—one of us at least groaning in agony most of the night!

Next day, the 24th of January, we went out in separate parties, two going into the pines immediately behind the tent, while the other pair worked the forest lying to the west. Very few birds were seen beside those noted on the previous day, but I obtained a Chiffchaff and a Berthelot's Pipit.

At lunch time I sat down half-way up the ridge, for the sun was hot and climbing difficult, when suddenly a bird flew noiselessly past and settled on the low branch of a pine about twenty yards below me. I snatched up my gun and fired at it before it became aware of my presence, and to my intense joy it fell stone dead—a beautiful specimen of a male Blue Chaffinch (*Fringilla teydea polatzeki*), with not a feather out of place. The bird had been perfectly silent, and I shall never forget the triumph with which I picked it up and shouted the good news to my companion. I felt as I imagine the big game hunter feels when he sees his first lion fall to his rifle! Having shot the male, we spent hours hunting for the female (which I felt sure must have been in company with the cock), but without avail, and after crossing the ridge into the next valley, we returned to camp to skin the precious trophy before any harm could befall it.

The other party got back later, and as we saw them descending the far-off ridge we greeted them with

a salute of guns in honour of the great occasion! A hasty glance at their "bag" revealed a Kestrel, a Rock Pigeon, and what we took to be a hen of the Common Canarian Chaffinch, and it was not until I had returned to England that I found the hen "*Canarian Chaffinch*" was in reality *a hen of the Blue Chaffinch*, for which we had been searching so long. How I failed to identify this specimen in the field I do not know to this day! Somehow it never occurred to us to examine the bird closely, so interested were we all in the beautifully coloured cock which had been obtained—so distinct in colouring from every other Chaffinch in the world save the Tenerifean bird; moreover we had no real Canarian Chaffinch for comparison, the difference in size escaping our notice in the excitement of the day.

Although we again searched in various directions for more Chaffinches, we only secured the one pair, but this was enough to make the whole trip an enormous success, and I had learnt that the Blue Chaffinch of Gran Canaria was not entirely the myth which I had begun to believe it to be. It is a genuine subspecies, very closely allied to the Tenerifean bird, from which the male differed chiefly in having—

1. The upper parts slightly more ashy olive;
2. The tips of the median and greater coverts almost white instead of bluish-grey;
3. The black band on the forehead considerably more pronounced; and
4. The bill slightly shorter.

The Gran Canarian bird inhabits a lower altitude than its relative in Tenerife, but otherwise the conditions under which it lives appear to be the same. It is evidently no mere coincidence that both the Blue Chaffinch and the Pied Woodpecker inhabiting the

pine forests of Tenerife and Gran Canaria respectively are represented by distinct subspecies in the two islands.

During this visit to the "Pinar" we were fortunate in having a full moon, and at night the view from our camp was indescribably beautiful, the mountains standing out as clear as by day, each ridge surmounted by a fringe of pines in sharp silhouette against the moon-lit sky. Indeed it would be impossible to picture a more delightful camping ground, and we never tired of watching the fine cloud effects which were obtained from here. Sunset was only rivalled by sunrise—the east turning from grey to pink, until the hill crests were lit up and the mists had faded away.

The last morning we were up at 4 A.M., and long before sunrise a roaring fire of fir-cones was cooking our breakfast. Shortly afterwards our extra men and mules arrived from Mogan, and by 6.30 we had the tent down and had begun our long ride to the coast, where Blandy's tug, the *Britannia*, was to meet us. Our journey back was uneventful; it was abominably rough, and as we returned by the west coast, we had made a complete circuit of the island when we rounded the Isleta and dropped anchor in Las Palmas harbour at seven in the evening.

Early February of the following year (1911) again found two of us encamped close to the Cueva de las Niñas, our intention being to complete the exploration of this part of the island.

We had crossed the Cumbres on mules, entering the "Pinar" above Juncal—a village of very poor appearance, from which a steep path led up to the pine-clad ridge. The view from the summit of this ridge was worth a very long ride; the sea could be seen far below shining in the midday sun, and rising as if from the depths of the ocean—a description which is literally

correct—the magnificent Peak of Tenerife towered into the sky, its sides glistening with snow. Once we had passed over the ridge, Juncal was lost to view, and the character of the country abruptly changed: instead of bare, unclothed mountain-sides, parched *barrancos* and overhanging cliffs, we beheld miles of pine forests, some of the trees grand specimens of *Pinus canariensis*, although here, as in all other parts of the Canaries, the trees have been sadly thinned by the improvident charcoal burners. As long as the charcoal burner, when brought to book for his offence, is made to pay so ridiculously small a fine, the woods of the Canary Islands will suffer, and some day must be entirely exterminated.

Our path, which was anything but good, now led through the forest in the direction of our former camping ground. Hardly had we entered the trees before I noticed, to my astonishment, a pair of Blue Chaffinches hunting about on the ground at the foot of a pine close to the mule path; these I shot, together with another hen bird, and altogether we saw about six pairs in the first mile of the “Pinar.” This was at an altitude of 4000 feet, and several others were met with between here and the Cueva de las Niñas. Woodpeckers were also plentiful in this part of the forest which I had never previously explored.

We pitched our camp just below our old camping ground on the 6th of February, and spent a week here completing our collections and field notes. The fine Edginton tent proved a great success, and the advantage of being able to sit in the shade with both ends rolled back to admit the breeze cannot be over-estimated. After the miserable white bell-tent which we had borrowed the year previously, this new one was an absolute boon.

I will confine the rest of my bird notes to species

which we had not hitherto met with in the forest; of these, Grey Wagtails, Canarian Shrikes, Blackbirds, and Canaries were encountered on the outskirts of the "Pinar," whilst among the Euphorbia bushes on the more open hill-sides (but never actually in the pines), were a good many Continental Song Thrushes (*Turdus philomelus philomelus*)—winter migrants to the Archipelago, and extraordinarily wild and hard to procure.

Every evening after dusk, a large Owl, which I am certain must have been either the typical form or the Slender-billed Canarian Barn Owl, used to fly over the tent, uttering its wailing cry, and in the brilliant moonlight was once plainly seen; we never succeeded in shooting it, and this is the only Barn Owl I have ever seen in Gran Canaria. It would be interesting to discover to which form it belongs. I feel sure it will be the same as the Barn Owl of Tenerife.

In the small deserted *barrancos* thickly overgrown with Euphorbias, *Plocama pendula*, and other shrubs, where the rays of the sun appear to strike with double their usual vigour, Red-legged Partridges are sure to be found; in such places they lie very close and are most difficult to flush, but when disturbed are very strong on the wing. In the early morning we used to hear a regular chorus of these Partridges calling to one another, but had the greatest difficulty in obtaining specimens. This form inhabiting the Canary Islands has been separated by Canon Tristram from the typical species, and has had the sub-specific name *australis* bestowed upon it. The bird is said to have been introduced into the Islands fairly recently, and it is therefore an interesting point that the Canarian race has become differentiated from the parent stock in so short a time.¹

¹ Cf. *Bulletin, British Ornithologists' Club*, vol. xxxv., p. 139.

I will conclude my description of the "Pinar Pajonal" with the field notes I made on the distribution of the Blue Chaffinch—notes which have already appeared in the *Ibis*.¹ The habitat of the Blue Chaffinch in Gran Canaria is very circumscribed, and appears to be confined to the pine forest known as the "Pinar Pajonal," while even in this limited area it seems to be locally distributed. That the birds move about the forest seems evident, for on one occasion I found them plentiful in the pines above Juncal, while a week later not a bird was to be seen in the same place. Occasionally single males were met with in remote parts of the forest, but no amount of searching would produce a hen. Unlike the Tenerifean bird it is remarkably quiet, and I have watched one sitting for a considerable time on a bough without uttering a sound, then flying silently to the ground and searching diligently amongst the pine-needles, a habit which I have remarked several times. If left to breed in peace by man, it should survive the extermination which so nearly threatened it. It has a great advantage over the Tenerifean bird, inasmuch as the Sparrow-hawk—such an enemy of the typical form—is a very rare bird indeed in Gran Canaria, and I did not meet with a single one in the "Pinar" during any of my visits there.

We left our camping ground on the 11th of February and returned slowly over the Cumbres, pitching our tent just below the Roque Nublo, at a height of 5000 feet, in the wildest country to be found in the island. A photograph of this camp is reproduced in the lower illustration facing this page. The Roque Nublo can be seen on the sky-line—a mass of rock standing 6110 feet above the sea. An idea of the barren nature of the ground may be gathered from this photo,

¹ 1912, pp. 613-17.



Pinus canariensis growing on the Ridges.
The home of the Blue Chaffinch in Gran Canaria.



Camp below the Roque Nublo, 6000 feet above the sea.

the shrubs in the right foreground being of the meagrest description, a species or two of *Euphorbia* and a few lava-loving plants, which I regret to say I did not identify. From a point below this camp, the views facing page 196 were taken, also looking towards the south. They give a better idea of the character of the island than any description. As can well be imagined, travelling on mule back is a slow proceeding when valleys and ridges such as those depicted have continually to be crossed. In one of the pictures the pine-trees can clearly be seen clothing the ridges.

Gran Canaria, so far as I am aware, has never been systematically "worked" by any English geologist, and without some knowledge of the subject a journey through the island must lose more than half its interest. Many years ago the eminent geologist, Charles Lyell, visited Gran Canaria, and some of his remarks bearing on the formation of the island have been quoted in a former chapter. It may be remarked here, however, that Lyell discovered fossiliferous remains at a height of 1500 to 2000 feet, while volcanic accumulations were found to rise to 6000 feet. His investigation led him to form the opinion that the island was of Upper Miocene date (Middle Tertiary Age).

The air at the elevation of this camp was very bracing, and we were fortunate in having the atmosphere particularly clear with hardly a cloud in the sky. I was greatly struck by the Red-legged Partridges to be found here; on every side of the little secluded valley they were calling one to the other, the birds perched on the highest points of rock which they could find. Few Passerine birds were encountered, but I came across one small flock of Canaries basking in a sheltered corner.

Early next morning we were awakened by the

hoarse cries of the Ravens flying over our camp, but on emerging from the tent, gun in hand, we found that we were shrouded in thick cloud, through which the forms of the birds could only just be made out as they passed leisurely overhead, appearing twice their natural size in the deceptive haze. A little later the Partridges began to call loudly amongst the rocks, and as the sun came up the mists quickly rolled away. We delayed our start in order to dry the tent before packing it on to the mules, for it might have been deluged with rain, so wet was the canvas.

Pigeons were scarce here, but we noted Buzzards, Vultures, Kites, and Kestrels, which are doubtless seldom disturbed in these mountain solitudes. Camping in this part of the Cumbres has a fascination altogether impossible to explain; one is at once gripped with the sense of extreme loneliness, and the silence of the mountains is even more pronounced than the silence of the forest. Above 4500 feet not a tree is standing, frowning cliffs and lonely waste meet the eye in every direction. It was with infinite regret that we left this camp and moved higher up still. On this ride we passed close to the isolated village of Tejeda, surrounded on three sides by mountains and lying at the head of the Barranco de Tejeda—a continuation of the colossal Barranco de la Aldea—which when viewed from the sea near Tenerife appears to divide the island of Gran Canaria into two parts. A view of Tejeda nestling in a valley in the Cumbres was obtained, but gives such a poor idea of the grandeur of the scene which met our eyes as we looked down upon the little white houses from above, that I have not reproduced it. Our next camp was on the flat tableland 5650 feet above the sea, almost the highest ground in the island. The summit of the Cumbres is for the most part flat,



The Cumbres towards the South—a succession of Pine-clad ridges.



An unexpected home of the Red-legged Partridge in Gran Canaria,
6000 feet above the sea.

the earth covered with loose stones and rocks, while vegetation of any kind is scant in the extreme ; in fact, a more parched and arid landscape can hardly be imagined. Not far from our camp were some high cliffs inhabited by an enormous number of Rock Pigeons, but as we were continually enveloped in cloud we did not explore far afield. While collecting on the plain, I saw a Chat-like bird which I certainly did not know by sight but while stalking it—it was very wild—a heavy mist came down, completely blotting everything from view, and by the time it had cleared away the bird had vanished. A single flock of Corn Buntings was noted, and two large flocks of Canaries—surely rather peculiar ground on which to find these little birds.

We left this, our last camp in the Cumbres, on the 13th of February, descending by the now familiar paths to San Matéo and thence to Las Palmas. At last, after four separate trips, we had been really successful in our efforts, and had formed an accurate idea of the avifauna of the “Pinar” and the Cumbres.

CHAPTER IX

A CAMPING TRIP TO THE CHARCO OF MASPALOMAS

IN the extreme south of Gran Canaria lies a little tract of country quite unique in character, the like of which is found nowhere else in the Archipelago. Situated on the coast, it is the nearest thing to a marsh of which the Canary Islands can boast, consequently several birds inhabit this district which are not to be met with in any other part of the island. These live in isolated seclusion, completely cut off by mountains and deserts from the country farther north. This district is known as the "Charco" of Maspalomas, of which further description will be given later. It had long been my intention to explore the neighbourhood, and with this end in view we left Las Palmas in the early hours of the 22nd of February 1912, travelling by motor from Las Palmas to Agüimes, where we had arranged to pick up our mules. Our tent and heavy baggage had been despatched by a fruit boat—the *Aguila de Oro*—and in this "converted yacht" my wife and two other ladies, who were accompanying us on the expedition, elected to travel, arranging to meet us at Maspalomas. For the first few miles after leaving Las Palmas the well-laid road runs along the sea-shore for some distance within a few yards of the waves, and finally passing through a tunnel which has been cut through the solid rocky headland which extends into the sea at this point. About



Wonderful Vegetation on the Lava Flow on the Telde Road.



Desert Vegetation—*Euphorbia* and *Tamarix*.

six miles from Las Palmas the road passes across a remarkable stream of lava which flows from the vicinity of the Caldera, burying itself in the sea just below the village of Jinamar. This stream of black lava is of a considerable width, and amongst the jumbled mass of lava and scorix we found a number of interesting plants. The accompanying illustration gives but a poor idea of the lava-flow, but is valuable from the point of view of the vegetation which can be seen growing upon it. The large "clump" on the left of the photo depicts a fine example of the remarkable *Euphorbia canariensis*, a species peculiar to the Canary Islands, where it is confined to the driest possible districts and is very locally distributed. Monsieurs Pitard and Proust, in their valuable botanical work on the Archipelago, say that it is common in all the Western and Central islands of the Group, but very rare in Fuerteventura and Lanzarote, and does not appear to grow at all in Graciosa and Allegranza. My own travels in the Archipelago lead me to think it is rather a rare plant on the eastern strand of Gran Canaria, while I did not meet with it at all in Fuerteventura or Lanzarote, and I am quite positive that it does not now exist in Graciosa or Allegranza. In Gran Canaria *E. canariensis* is confined to the Maritime Zone, and during this expedition we were to meet with it again growing in profusion in a very different situation.

Another plant which will be recognised in the photograph (in the extreme bottom left-hand corner), is the miniature Dragon-tree (*Kleinia neriifolia*), a very different type of plant but chiefly confined to the same zone, and often found growing in close association with the candalabra Euphorbia.

After passing the lava-flow, the country through which the road winds is barren and uninteresting, lined

for a large part of the way with aloes, whose grey-green spear-like leaves have a truly exotic appearance. The drive is uninteresting until Telde is reached, a fair-sized town, renowned principally for the magnificent oranges which are grown in the neighbourhood. These oranges are the finest I have ever tasted, and in January, when the crop is at its best, the orange groves are a beautiful sight. The town of Telde in itself is not very striking, and the eye is greatly relieved by the palm, orange, and banana groves (see accompanying illustration) which surround it. We passed through the town without a halt and on through Ingenio to Aguimes, the road still running parallel with the coast, from which bare, undulating hills stretched inland to the foot of the Cumbres. Our two men and mules met us as arranged at Aguimes, and having transferred our light baggage from the car we soon began our long ride to Maspalomas. A steep track leads down from the plateau upon which Aguimes is built to the plain below, and from this elevation—some 800 feet—we viewed the country over which we had to pass. Before us lay a plain stretching from Carrisal to Sardina. The ride over this barren country was monotonous in the extreme; the track was almost undiscernible, the ground covered with loose stones and occasional large lumps of lava, amongst which a few species of stunted Euphorbia and the desert-loving forms, *Launcea spinosa* and *Plocama pendula*, struggled for existence. Birds were as scarce as might be expected, and the only Passerine species noted was Berthelot's Pipit. There are no Crested Larks of the genus *Galerida* in the Canary Islands, and no representative of the Chat family is resident in any of the Western Group. A few Kestrels and a Kite hovered over the plain, while Egyptian Vultures were more than usually numerous, for ever



Orange and Banana Groves near Telde.

searching the landscape with their eyes for the sight of a dead mule or dog.

As we neared Juan Grande the country became less barren and in patches was even cultivated. The village is marked by a cluster of palms growing in the private garden of the Condé de la Vega Grande. Rock Pigeons were here plentiful, and I counted as many as twenty Ravens following a plough. One of these we obtained. We lunched near the village and rested our animals under the shade of a wall, for it was very hot. Beyond Juan Grande the plain changes somewhat in character, and the bare aspect is relieved by many huge clumps of *Euphorbia canariensis* growing on either side of the track.

An hour's ride further on the ground became more sandy and in parts overgrown with a large bushy *Euphorbia* (? *E. obtusifolia*), which grew to about 4 or 5 feet in height (see illustration facing page 198). Berthelot's Pipits were still numerous, two Grey Shrikes were noted, and a fair number of Polatzek's Short-toed Larks. This little Lark is a most interesting and tame bird, about which a good deal of controversy has taken place. Short-toed Larks are found in Gran Canaria, Fuerteventura, Lanzarote, and Tenerife, but are not all of the same geographical race; the bird inhabiting Gran Canaria has been separated by Dr Sassi and named *C. m. distincta*, but after examining a large series from the various islands, I believe that the Gran Canarian form is indistinguishable from the bird found in Fuerteventura and Lanzarote, and must be known as *C. m. polatzeki*. The Short-toed Lark inhabiting the island of Tenerife is, however, quite a distinct form, being much more rufous in colouring, and bears the name of *C. m. rufescens*. Polatzek's Short-toed Lark is rather local in its distribution in Gran Canaria;

I have met with it and taken the young on the Las Palmas golf links, but it is much more plentiful on the arid plains in the south of the island.

As we neared Maspalomas the track became more rocky, and at times led down within a few feet of the water's edge. Occasionally we were forced to climb some way up, as the sandy scrub gave way to low rocky cliffs. Messrs Elder & Fyffe have a fruit store just beyond the cliffs, where the ground again slopes gradually to the sea.

It was late before the little steamer hove in sight, and as the country between the fruit store and the Charco is best traversed by daylight, we camped here for the night. The surf rolls in to this little cove very heavily, so the *Aguila de Oro* anchored some way out. My wife and the other two ladies were transferred from the old yacht to a strong rowing boat, and this was brought fairly close to shore, when the occupants were landed by the boatmen. The photo of my wife being carried ashore "sedan-chair fashion" shows this precarious mode of landing, amusing enough on a calm day but distinctly exciting when the surf threatens to sweep one's bearers off their feet! Our camp was close to the beach, but on a very arid plain; the accompanying illustration which is reproduced of one of the tents gives a fair idea of the desert aspect of the surrounding country. Several interesting birds were seen here; Ospreys were not by any means rare on this part of the coast, and it was while at this camp that I disturbed quite a gathering of Waders on the pebbly beach; Kentish Plover, Turnstone, a Black-tailed Godwit, a Greenshank, and a small flock of Grey Plover, of which last species I obtained two specimens, the first recorded from this island.

A Lesser Black-backed Gull was also seen close to



Coming Ashore at Maspalomas.



Camp on Maspalomas Plain.

this same spot, but was not obtained. It probably belonged to the light-backed race (*Larus fuscus affinis*), which in winter wanders down the coast of France, Portugal, and North-West Africa, at any rate as far as the Canary Archipelago. In proof of this, I have the particulars of a Lesser Black-backed Gull marked as a nestling on 2nd August 1913, at the Farne Islands, off Northumberland, which was recovered off Cape Juby on the 13th November of the same year, at a distance of approximately 3000 statute miles by direct sea route from its place of birth.

The owner of the Maspalomas Charco is a distinguished Spaniard, Don Pedro Castillo, who, being aware of our visit, most kindly sent his major-domo early the morning after our arrival to assist us in transporting our tents and baggage to our next camping ground. For these an ox-waggon was obligingly put at our disposal, and we ourselves set out on mules to cross the neck of heavy sand which separated the landing-place from the Charco. This ride, owing to the nature of the ground, and our continuous halts for shooting by the way, took a good two hours to accomplish. At first the path led over a plateau sparsely covered with Euphorbia bushes, and here we flushed several Norfolk Plovers (*Ædicnemus œdicnemus distinctus*). This geographical race has been named on account of its differences from the form inhabiting the Eastern Islands of the Group (*Æ. œ. insularum*). The habit which the Thick-knees have, all over the world, of running when alarmed, rather than taking to flight, causes them to be very difficult birds to collect, and the extraordinary similarity between their plumage and the ground which they frequent, makes them utterly impossible for even a practised eye to detect as long as they remain motionless, a protective

character which they do not fail to utilise whenever danger threatens them. I have spent hours trying to flush these birds on the Euphorbia-covered slopes of a *barranco* close to the Las Palmas golf links. While wandering over the hills beyond the links I have occasionally been startled, when entering one of the many caves which abound in this neighbourhood, to discover a sleeping *contrabandista* in safe retreat waiting till nightfall to continue his perilous journey, when the watchful eyes of the *guardias civiles* are less likely to mark him down.

But to continue our journey to the Charco. Having crossed the stony plateau and left the Euphorbia scrub behind, we descended on to rolling sand-hills covered with coarse grass and *Plocama pendula*, a rubiaceous desert plant with slender, weeping branches. Here we met with a bird which I had long desired to see in its native haunts—the Cream-coloured Courser. Like the Thick-knee, the Courser harmonises so perfectly with its surroundings that it is very difficult to spot unless it begins to run, and in this way it usually betrays its presence, rather than by taking to flight. On these sand-hills Coursers were quite numerous, and this is certainly their true home in the island. The birds were seldom seen in pairs, although it was late in February, but were in small flocks of half a dozen or more, scattered over the ground in “open order.” As we drew near a flock, the birds would “close in” and all run swiftly to hide behind a rise in the ground, where they would remain perfectly still, for all the world like well-drilled troops “taking cover”! In this way they were particularly easy to shoot, and I found by jumping off my mule, keeping low and running swiftly towards the mound behind which they were sheltering, that I

came within easy shot of them before they rose. Even then they never flew very far away, but circled round, repeating their sharp piping note. In flight the Cream-coloured Courser is a conspicuous bird, the under wing-coverts and under surface of the wing being black, which then show up markedly. Why the Courser should be so noticeable on the wing when it is almost invisible on the ground is rather a problem; perhaps when the bird raises its wing above its head while still remaining on the ground, the dark underside harmonises with the dark shadows thrown by the stones, so often found in the type of country it frequents, though not present on the sand-hills of Maspalomas. Whether the Courser is harried much by birds of prey I cannot say; probably it is, and then the sandy colouring of its upper parts would be sufficient to afford it protection from the watchful eyes of the Kite or Buzzard soaring overhead.

We took some time to cross these dunes, the sand being in places very soft, and on more than one occasion a mule floundered and rolled over while scrambling up the crest of a wind-blown ridge. As we breasted the last sand-hill the lighthouse of Maspalomas came into view, and the whole of the "Charco" lay spread out before us. It is a fairly wide stretch of flat marshy ground, with here and there pools of almost stagnant water, the banks of which are thickly overgrown with low tamarisk bushes, coarse spiky grass, a species of rush, and several water plants. On the eastern side of this marshy land a narrow tidal stream flows from the hills, widening a good deal towards the mouth. From this main stream one or two smaller arms wind their snake-like way into the tangled mass of vegetation—tamarisk scrub, hummocks covered with coarse grass, and stunted palm-trees. In the middle of the Charco a clump of twenty or more tall palms wave their feathery

heads above the marsh and lend a great charm to the picture.

The Charco is bounded on the east by the sand-dunes over which we passed, and on the west by an arid plain stretching away to Arguineguin. The plain to the north is covered sparingly with tamarisk scrub and stretches to the foot of the mountains. On the south is the sea, which at low tide exposes a fine stretch of sand, but when the tide is in the waves reach to the edge of the scrub, and the salt water runs far up the channel of the main stream (shown in the illustration opposite), which then becomes a wide belt of water. I have described the Charco minutely, to show how completely the birds here are isolated, living in surroundings differing greatly from the rest of the Archipelago.

We pitched our tents some way from the sea, close to a patch of tamarisk scrub, on the east side of the main stream, which was here very shallow and much overgrown with reeds. At the mouth of the Charco stands the lighthouse, a fine solid building 180 feet in height, by which many a ship has been saved from running aground on this forbidding coast. The small village of Maspalomas is situated between the Charco and the entrance to the Barranco de Fatarga, almost under the shadow of the mountains, and in the neighbourhood of the village a fair amount of cultivation has taken place. Maspalomas is the Spanish for "more pigeons" (*Mas* = more, *palomas* = pigeons), and the name is singularly appropriate, for the Rock Pigeons simply swarmed and provided most excellent shooting. At the time of our visit in February, much of the Charco was dry, but in times of heavy rains, when the dry beds of the *barrancos* are transformed into rushing torrents, a great deal of water must find its way into the Charco, and becoming dammed then turns the marsh into a veritable swamp.



The "Charco" of Maspalomas—*Tamarix canariensis*.



Water-plants in the Maspalomas "Charco."

More or less isolated in the Charco are several interesting species of land birds, among which I was delighted to find the Canarian race of the Sardinian Warbler (*Sylvia melanocephala leucogastra*); here five or six pairs were observed hopping about in the tamarisks and darting in and out of the tussocks of long grass. Their flight is very curious and at once attracted my attention; the male has brilliant orange-red eyelids. The Black-headed Warbler (as it is sometimes called) of the Canary Islands differs very slightly from the typical race, but the characters which distinguish it are constant and are more marked in the females than in the males.

Chiffchaffs were often noticed and must be resident. I naturally expected to find many water birds living in this type of country, Ducks, Herons, Coots and Moorhens, etc., but in this I was disappointed. We certainly saw an occasional Heron in the Charco, and one bird in particular lived between the reed beds and the shore. Coots and Moorhens were not noted, though I certainly caught a glimpse of a bird diving under the overhanging grass in one of the pools (shown in the lower illustration facing page 206), which might have belonged to either of these species. An Austrian naturalist who visited the island in 1909 records having met with both species, and remarks that they bred in the Charco and also in the pools of Arguineguin farther down the coast, observations which I can neither substantiate nor refute. The conditions are ideal for water birds to breed, but it is more than likely that their nests, if found, would be plundered by the villagers of Maspalomas.

Shooting in the Charco on the 24th and 25th of February, we flushed two Common Snipe, migrants to the Archipelago, and a Marbled Duck (*Marmaronetta angustirostris*). Of this species Dr Bolle wrote in 1857:

"This Duck, common in Algeria, is the only one of its species which lives in Canaria as a breeding bird. In May I saw them with their young ones in the ponds surrounded with rushes and water-plants at the Charco."

Ducks are never numerous in Gran Canaria. Bolle recorded the Wild Duck from Maspalomas when it was said to appear in winter after strong gales; Teal are occasionally shot on the water-tanks above Las Palmas, while many years ago the Common Scoter and the White-eyed Duck have been shot on the shores of the island.

We spent a week in the Charco, and every morning would wend our way into the marsh on the look-out for rare birds, which must occasionally rest here as they pass through the Islands on migration or are driven from the mainland by storms. In this way Spoonbills and other curious Wading birds have from time to time made their appearance. Every evening about five o'clock we used to see Hoopoes fly down from the direction of the village into the marsh, and occasionally a Madeiran Black Swift in company with a passing Martin would appear, hawking high overhead, or swooping round the tallest palm-trees. An Osprey was often noticed beating backwards and forwards over the Charco, and these fine birds are, I am glad to say, quite plentiful in the south of the island. When the tide was out we used to stroll down the stream to the shore on the look-out for Wading birds, of which we saw quite a number. Ringed Plover, Sanderling, and Dunlin, were all obtained, passing migrants on their way north to breed, while Kentish Plover were very plentiful and breed along many parts of the coast. The eggs of the Lesser Ringed Plover have also been taken near Las Palmas, but the bird is very rare in the Islands and I have only seen it on a few occasions. Whimbrels were to be heard calling on the rocks near

the lighthouse, and two or three pairs of the Common Sandpiper frequented the marsh, and I am almost certain breed there.

When evening fell, the Charco, viewed from our camp, looked like fairyland, the palms contributing in no small measure to the beauty of the scene. As the sun sank behind the marsh, the sky would become suffused with lovely shades of salmon-pink and delicate green, against which the bare outline of the lighthouse stood out in bold relief; twilight was very short, as I found to my cost, when shooting bats as they circled round the palms.

We made several excursions from the Charco camp, sometimes riding over the parched plains towards Arguineguin, at others along the shore in the opposite direction. It was on this part of the coast that in Bolle's day, about 1856, the Terns used to breed in hundreds in the sand-hills, but have now, it appears, entirely ceased to do so. The Spaniards from the neighbouring villages plundered the nests year after year, and, as we are told, carried away baskets full of eggs which they ate. These Terns were probably all *Sterna hirundo*: none were seen during our visit, and we were told they had entirely disappeared from their former nesting colony, a fact which is to be very deeply regretted.

One evening, as we were "paddling" at the mouth of the Charco, we espied a whole fleet of little fishing-boats dancing over the waves, and all heading towards the shore about a quarter of a mile down the coast. Not wishing to be seen we lay down behind a sand-dune, and watched the fleet "run aground." As the boats touched bottom the fishermen leapt overboard, and with their coloured trousers tucked well up their muscular legs, hauled the boats on to the sand; the men then set to work to clean their fish, and in a moment were

surrounded by a screaming mass of Red Kites. Whence the Kites had appeared no one could tell, for none had been visible before the sails hove into sight. I had not seen so many Kites in the island; the birds must have known the reason the boats were heading for shore as they circled high in the heavens, gloating over the feast which they knew to be in store for them.

When we had thoroughly "worked" the Charco, had ascended the lighthouse, from which a rough map of the surrounding country was made and various photos taken, we set out early one morning to ride inland, intending to explore the Barranco de Fataga. As we rode towards Maspalomas village a number of Coursers were seen and a pair of Shrikes sat on the top of a prickly bush, darting away at our approach. Norfolk Plovers inhabited this ground, and their weird call could be heard every night; they preferred the Euphorbia-covered land to the bare plain. We also noticed flocks of Trumpeter Bullfinches, Pipits, and Short-toed Larks during our ride to Maspalomas. As we approached the village, Corn Buntings, Hoopoes, and Blackbirds were seen, while Rock Pigeons and Spanish Sparrows simply swarmed, and must do a great deal of damage to the grain. The day was terribly hot, and our guns, slung over our backs, became almost too heated to hold.

It was my intention to penetrate as far up the Barranco de Fataga as possible, but by bad luck the gorge divides into two not very far from the base, and having no guide with us we took the wrong one. I had been anxious to explore this *barranco*, as it was rumoured that there was a number of caves in its sides, which had been used in olden days as burying-places of the Guanches—the ancient inhabitants of the island. In a future expedition I hope to do this, and to be

better prepared for the undertaking, knowing, as I do now, the difficulties which will be encountered.

The bed of the *barranco* up which we elected to proceed was covered with loose stones and boulders, all more or less rounded off, showing that they had been subject to the action of water. Indeed, after heavy rain in the mountains the stones are probably covered with a rushing torrent, and almost at the farther point which we reached were several ice-cold deep pools which had never dried up. The sides of the *barranco* rose in height as we advanced and became steeper and steeper; a certain amount of vegetation existed, the curious *Plocama pendula* predominating; Chiffchaffs, Sardinian Warblers, Blackbirds, and Canaries were noted, besides all the birds of prey—Vultures, Kites, Buzzards, and Kestrels. I did not meet with the Lesser Peregrine (or Barbary Falcon as it used to be called), which, however, has been seen in this neighbourhood by more than one competent observer. Canon Tristram saw a pair in the Cumbres in 1888. I was particularly interested to find a colony of Madeiran Black Swifts, which were entering some holes high up in the face of the cliff: these little Swifts are a mountain-loving species which breed in the island, and are only absent during the months of November and December, and even then a few individuals are probably left behind. Where these Swifts betake themselves when they leave the Islands for these two months is a mystery that has not yet been solved. The Black Swift is very seldom seen in the north of Gran Canaria lower than Tafira (1080 feet), its place being taken in the lower altitudes by Brehm's Pallid Swift.

High up above our heads a number of caves could be seen in the cliffs, and very likely without our knowledge we were passing the tombs of natives who had lived and died more than four hundred years

previously. Much of the ancient history of Gran Canaria is still locked in mystery, but in Chapter I. a short resumé has been given of the discovery, conquest, and original inhabitants of the Archipelago.

In the early morning of 2nd March, we struck camp and began our ride back to Aguïmes, intending to camp for the night at Juan Grande. The long ride over the scorching plain proved very tedious, as we had already noted all the bird-life in this district. With the blazing sun on our backs it was with considerable relief that we covered the last half mile towards a regular oasis in the desert—the beautiful garden of the Condé de la Vega Grande. Here we asked permission to pitch our tents under the welcome shade of the many palms, huge tamarisks, and various other trees; the Count's major-domo happened to be a brother of the major-domo who had shown us such kindness at the Charco, and both he and his wife gave us a hearty welcome, putting, as is the charming Spanish custom, their house, garden, chickens, and everything they possessed at our disposal.

We pitched our tents in a shady part of the garden and were very thankful for the shelter of the trees. A high wind from the sea greatly increased in violence during the night, and we momentarily expected one of the tents to come down. The brilliant moonlight pouring down through the trees made reading almost possible within the tent; I never remember a more gorgeous night: in the distance the roar of the waves could just be heard above the souging of the wind in the palm-fronds. It was almost impossible to sleep, the sides of the tent flapping continuously throughout the night. Lying awake I strained my ears for the hoot of an Owl—a sound I longed to hear! No rain had fallen in this little oasis for nine months, and in consequence the crops

had failed and many of the palms had been lopped, the dried fronds being used as forage for the animals.

Almost before it was light the Hoopoes began calling "Ta-bo-bo, Ta-bo-bo-bo"—the soft cry resounding from distant parts of the garden. We were out early in the hopes of shooting a Raven, several of which kept passing overhead, but were too wary to alight on their favourite date-palm within gunshot of the tents. Black-birds were hopping about in the undergrowth in the familiar manner of their cousins in our shrubberies at home.

Soon after breakfast we had the tents down, and mounting our mules left our garden of refuge behind and rode slowly back to Aguïmes. There a motor met us and we parted from our mules and men; both Ventura and Lorenzo with their dog "Corvato" had been with us on previous trips, and the same excellent mules. Lorenzo is now too old for this sort of work, but Ventura is a younger man, and being one of the best and most trustworthy of Spaniards will, I hope, some day accompany us again. Regretfully we bade them "*Adios!*" and watched them climb the winding bridle-path on their final journey across the mountains to San Matéo.

CHAPTER X

IN SEARCH OF THE CANARIAN RED-LEGGED PARTRIDGE

SEVEN years had elapsed since I had last set foot in the Canary Islands, when, at daybreak on the 24th of January 1920, the s.s. *Matina* steamed quietly along the north-east coast of Tenerife and dropped anchor in the roadstead of Santa Cruz.

It was my intention to visit and collect in the two most westerly islands of the group, Palma and Gomera, almost the only islands of the Archipelago which I had not yet explored. First, however, I wished to obtain, if possible, specimens of the Gran Canarian Red-legged Partridge (*Alectoris rufa australis*), a rare bird very poorly represented in our museums in Great Britain.

Although I had made many expeditions in Gran Canaria and knew the island pretty well, I had only once succeeded in shooting a specimen of this Partridge—at the Cueva de las Niñas—on the outskirts of the “Pinar Pajonal.” I knew that the birds were to be found in the Cumbres, where I had seen them, but from past experience had little hopes of shooting more than a single specimen or so in these mountains, the difficult nature of the ground being greatly in favour of the bird. With this object in view, therefore, I crossed from Tenerife to Gran Canaria on the 25th of January. The voyage to Las Palmas was made in a dead-calm sea in the *Correillo Fuerteventura*, and was noteworthy for

the fact that a large whale, unfortunately not identified, was sighted close to the little steamer, swimming on the surface of the water, a very unusual occurrence in these waters. The complete absence of Shearwaters and Petrels was noted, but only to be expected at this time of year—corroborating my previous experiences.

The usual delay occurred at Las Palmas before permission to shoot game was finally obtained, thanks once more to the kind offices of Major Swanston, H.B.M.'s Consul in Gran Canaria, and meanwhile a week was spent at Firgas collecting birds in the neighbourhood of that mountain village.

The early months of 1920 will long be remembered in the Canary Islands for the phenomenal weather which was experienced there. On the night of the 7th of February, while we were still in the hills, a tremendous southerly gale broke over the Islands, heralding the approach of a remarkable dust-storm¹ and driving us back to Las Palmas. Very fine particles of reddish brown dust filled the air, coming apparently from over the sea, and making a thick, impenetrable haze, so that very soon all shipping in the harbour of Las Palmas became obscured from view, and the usually clear atmosphere was more like that of London during a heavy November fog. For four days the dust-storm raged, filling every nook and cranny; the whitewashed houses gradually lost their usually dazzling appearance and were soon coated with the red dust from roof to basement; the housewives of Gran Canaria were in sore distress, the English residents almost frantic, and small wonder at it. How far out to sea the dust was falling

¹ Specimens of the dust collected at the time were submitted to the Mineralogists, Zoologists, and Botanists at the British Museum of Natural History. Their report, drawn up by Mr Campbell Smith, which proved to be of exceptional interest, is given in full as Appendix A.

it was difficult to ascertain, but masters of ships reported the sand-storm many miles from the Islands. On the 11th of February the atmosphere was cleared by torrential rain, which turned the dust into fine mud, the streets into rivers of slush. Ducks and other "visitors" from Africa were reported in some numbers from various parts of the Islands, but in Gran Canaria, at any rate, the Ducks principally visited the south, this being the first shore they would reach, and, moreover, much more suited to their requirements than is the north. At last, after a week's imprisonment, the weather seemed to be clearing, and seizing what I hoped to be a favourable opportunity, I left for Galdar on the 15th of February, which village, situated on the north-west of the island, I selected as the most convenient from which to start my trip.

Owing to the kindness of Mr Douglas Fenoulhet, whose guest at Galdar I was, every possible arrangement had been made for a successful expedition—the weather only was in doubt. Tuesday, the 17th, broke fine and clear. From my window, which looked on to the shady *plaza*, I caught a fine glimpse of the Peak of Tenerife, glistening white from a fresh fall of snow. The first part of the journey from Galdar to Agaëte was made in the tireless "Ford," and at Agaëte, where the *carretera* ends, my guide Vicente and two fine mules were awaiting me beneath the shade of the eucalyptus trees. The country lying between Agaëte and Galdar is utterly uninteresting—barren stony hills with little if any vegetation, and hardly a bird to cheer the heart of an ornithologist. In the immediate neighbourhood of Galdar, banana plantation succeeds banana plantation in endless monotony, while at Agaëte a little more variety is added by the fields of tomatoes and by the pleasanter situation of the town. The *barranco* was

then in full flood, and with plenty of water coming down from the hills, everything looked green and prosperous. It was still chilly at eight o'clock, as, bidding adieu to Agaëte and mounting our mules, we commenced at once to climb the Euphorbia-covered slopes of the hill-side lying to the south of the town. It had long been my desire to ride along the mountainous western coast of Gran Canaria, and as we had decided to make Aldea our headquarters, my wish was soon to be realised. The Barranco de Aldea, famous for the grandeur of its scenery, lies almost half-way to the south of the island, and owing to the width of the valley and enormous height of its precipices, seems, when viewed from out at sea, to cut the island in two. The scenery passed on this ride along the cliffs is reputed to be very fine, but I was hardly prepared for the grandeur of the coast scenes which met the eye as every fresh headland was passed.

Having ascended the slopes above Agaëte the path drops abruptly on the other side, passing through a thick belt of arborescent Euphorbia bush, while high up the face of the *barranco* a striking group of *Euphorbia canariensis* plants added their own peculiar character to this typically Canarian valley. The view before us as we stumbled down the boulder-strewn path—it was too steep to ride—was one of the finest imaginable. To the south, headland after headland, rugged in outline, ending in Aldea Point, stood out to sea. The cliffs rising to a great height fell away a little and then rose again, their summits veiled in drifting mist. As the clouds swept back and lifted for a moment, I caught glimpses of pine-covered crests towering far above in an angry, storm-swept sky. At the foot of the *barranco* a tiny farm—a few fields cultivated with infinite labour and care—a goat, a

kid, and a palm-tree served to remind us that we were still within hail of "civilisation." We crossed the narrow stream which flowed swiftly down the usually dry *barranco* bed, and commenced the long pull up the opposite side. After the heavy rain the *barrancos* were marvellously green, even grass appearing here and there in the usually parched volcanic soil, while in places the sides were decorated with small blue and white flowers.

The mule path rose steeply, and we were almost lying flat as the beasts clambered like cats up, ever higher and higher. We had soon gained 600 feet and still the track led up. At 1000 feet above the sea, the path leads due south, clinging to the face of the mountains, which here fall precipitously to the waves. Occasionally, the white wings of a Yellow-legged Herring-gull caught the eye far below us, otherwise birds were entirely absent. The sun was shining through a rift in the clouds on Agaëte Point, while the rest of the scene was in shadow. Far above us towered the summit of the *risco* fringed with pines, occasionally visible through the driving mists. The scenery here is truly very grand. As we rounded each spur of the mountains the views became wilder, the path was sometimes barely the width of a gun's length, one's shoulders almost scraping the side of the cliff, while a fall from one's saddle on the opposite side would end 1000 feet below. We descended into several narrow *barrancos* and clambered up the opposite side, rounding headland after headland, the path still hugging the cliff's edge; indeed it is often impossible to see the path fifty yards ahead, so rugged is the *risco* and so narrow the track. An Egyptian Vulture was disturbed as we rounded one of the spurs, and the great bird, shut in by the walls of rock, flapped awkwardly over our

heads, until gaining the cliff edge it sailed majestically out to sea. We passed through a remarkable wall of rock capping a headland, and yet another series of spurs confronted us in apparently never-ending succession. Now and again the hoarse croak of a Raven resounded far below. At length the path descends and leads inland a few hundred yards from the sea, the *riscos* fall back, leaving an undulating country, rocky but well covered with vegetation, amongst which the *Euphorbia canariensis* is again conspicuous. Rock Pigeons were now fairly common, but we had little time for loitering on such a journey, and after two fruitless attempts to stalk a large flock busy feeding in the open, I gave up the chase and returned to the saddle. We descended right to the foot of the valley, in which were a few farms, above which a Kite was soaring. The path now led up the *barranco* bed, usually, of course, perfectly dry, but now a rushing torrent; we followed its course for a hundred yards or more, the mules picking their way very slowly through the swiftly-running stream. From this point we began the most arduous climb up a winding track, covered with loose stones; rising swiftly above the valley and the little white farms, we at length ascended to 1500 feet. Immediately I was aware that the vegetation had changed, and that the character of the country was different from any which I had previously traversed. Before us lay, at an altitude of from 1500 to 2000 feet, a basin several square miles in extent, one side of which fell away to the sea in steep precipices, but which was otherwise entirely enclosed by an immense wall of mountains rising another 2000 feet above us, and whose slopes were clothed with pines. The ground was undulating and irregular, steep ridges leading on to flat plateaux intersected by numerous small *barrancos*

running diagonally to the coast. Many of the hills were crowned with huge boulders, and the whole overgrown with vegetation. The soil itself was covered with stones of various sizes, and upon this in every direction grew the small bushy *Cistus monspeliensis*, bearing many white flowers with bright yellow centres. This shrub grows here to the exceptional height of 2 or 3 feet, affording remarkably effective cover.

Occasionally, the summit of a ridge or hill is covered with a mass of enormous rocks, amongst which a yellow-flowered *Euphorbia*, and the ever-present white-flowered *Cistus* give a distinct character to this inaccessible region. The district is known as Tirma, and here the Red-legged Partridges are still to be shot by anyone sufficiently energetic to reach their stronghold. I had no dog, and soon regretted not having brought one. The Partridges are really very difficult to shoot in such places, and when flushed among the boulders, dart round the rocks, wheeling and turning with bewildering rapidity. One's only chance is to walk right upon them over the top of the "kopje," and then, as likely as not, they will fly right out, hoping to reach the spur beyond. A bird which I shot in this way fell over 200 feet to the very bottom of the *barranco*, and naturally was not improved as a specimen. Sometimes one may be lucky enough to flush the birds on an open plateau, and the first pair I stumbled across in this way fell to my gun—one twenty yards away, the other just over the edge of the ridge, and hunt as we might it was impossible to find it amongst the white shrub which was particularly thick at this point. In the small *barrancos* a few birds were found lying amongst the overgrown boulders which line the bed, but in such situations are exceptionally difficult to obtain. Indeed, one's attention has to be given all

the time to keeping one's own feet and in avoiding spraining an ankle or crashing the gun-barrels against a hidden rock. A new pair of good leather boots lasted me three half days on this Partridge ground.

As soon as we had arrived at the home of the Partridges, we dismounted from our mules and handed them over to a goatherd who, luckily, chanced to be near, directing him to lead the animals along the path towards Aldea, while we unslung our guns and prepared to "walk up" the birds. We had already been five hours in the saddle, two hours having been lost on the way, as part of the cliff, over which ran the regular path, had fallen away, necessitating a long detour. It was another three hours' ride to Aldea, and as it is not a path to attempt for the first time after dark, we had barely two hours in which to search for the birds. Several were seen and four shot on this first day, but unluckily, without a dog, only two were picked up. They are magnificent Partridges and fly very strongly, having adapted themselves admirably to the difficult country in which they live.

From a sportsman's point of view they leave nothing to be desired, and though not so "tasty" as our English birds, doubtless by reason of the food upon which they subsist, are not by any means to be despised, and in the hands of an English cook their table value would greatly increase. Unfortunately, I fear the Gran Canarian Partridge is doomed, unless, perchance, the bird can manage to hold its own in such places as Tirma, or in the Cumbres, where an expedition is a costly and fatiguing business, not lightly to be undertaken by any but an enthusiastic ornithologist bent on getting the birds at any cost. The bird has long since disappeared from the Monte and from the neighbourhood of Las Palmas. I know of other

places—more accessible than Tirma—where three or four Partridges may still be bagged in a morning, and which are now strictly preserved by the owner of the land, especially at the breeding season. In years to come, possibly, the owner of this estate may not be so wise in his generation, and then the poor Partridges will be exterminated in yet another district.

It may not be without interest to quote here the notes made on this Partridge by the late Canon Tristram, F.R.S., in 1889, during an ornithological visit to Gran Canaria. It will show how very much things have changed in the last thirty years. He wrote¹—“It is found in small numbers over the whole country, and seems to have a greater facility in adapting itself to all kinds of country than its congener. Thus while in Tenerife and Gomera the Barbary Partridge affects especially the lofty cliffs overhanging the sea, and the rocky declivities high up on the verge of and beyond the limits of cultivation, the other species in Gran Canaria is found from the coast on the most barren shores, upwards on the cultivated sides of the *barrancos*, and even on the mountain-tops, the barren Cumbres, where vegetation has almost ceased. Not only is it numerous in the barley and wheat fields above San Bartolomé, but I have put it up in the vineyards near Atalaya, and one day Mr Meade-Waldo, walking with me, flushed a pair evidently breeding on the barren cinder hills, not a mile outside the city of Las Palmas. I also put up a pair on the side of the Pico de las Nieves at 5700 feet, where there was absolutely no vegetation but a small *Draba* (?) . . . and some lichens, and where we were walking over the snow which had fallen in the night. I saw for several days, and just before the close season, numbers

¹ *Ibis*, 1889, p. 27.

of Partridges for sale in the market of Las Palmas and only of this species."

It is a very different story at the present day. The Partridge is no longer seen—even in pairs—in Las Palmas market, and one would walk many miles in the neighbourhood of Atalaya before catching a glimpse of a single bird. A few pairs still remain in the almond district of San Bartolomé and Tirajana, but there they are often hunted, and are, I fear, doomed to destruction. We must hope that the birds in the mountain fastnesses—luckily for them almost inaccessible to the average sportsman—will continue to thrive and multiply, for even though sought after, the chances in such places are distinctly on the side of the bird.

But to continue our journey. At the end of two hours' scrambling over the worst ground I have ever struck, we regained the path and the mules, with two beautiful specimens of *Alectoris rufa australis* packed carefully away in a fishing-basket. It was with considerable satisfaction at this thought, mingled with the bitter pang that I was leaving two more dead birds hidden somewhere in the undergrowth behind, that I threw my weary legs across my mule and we set out once again for our destination. Half an hour's ride over much the same type of country brought us to where the mountains again curved round in the direction of the coast, and passing over a tableland we left the *Cistus* scrub behind and commenced to skirt the mountainous mass which lay immediately before us—the path again cut out of the precipice side, where I remarked curious cliffs of red and green tuff.¹ As we rounded what seemed to be the last of many turns on the face of the cliff, we beheld Aldea lying about

¹ These rocks (specimens of which I secured) were described by Webb and Berthelot as jaspar and porphyry many years ago.

a mile from the sea in an immense valley known as the Barranco de Aldea. Viewed from the point upon which we stood, 2000 feet above the village, we gained a splendid idea of this celebrated valley. From a wide rift in the coast two great *barrancos* unite, the one running south-east—the Barranco de Aldea—the other north-east, almost parallel with the coast-line, from which it is separated by cliffs gradually increasing in height as they run northward. Beyond the village of Aldea the mountains rise again and tower each side of the *barranco* to a great height. Just now they were hidden in driving cloud, boding ill for my journey to Juncal. Slowly the mules picked their way along the narrow path, the *risco*s towering above us weathered into all sorts of fantastic shapes and abounding in caves with entrances curiously formed as if twisted by terrible heat—the result of some awful convulsion which no living thing in the island could have survived. Now the *risco* is clothed in wonderful indigenous vegetation, the savage rocks give shelter to miniature Dragon-trees, while rosette-like members of the genus *Sempervivum* cling to their surface; the mountain-side is a blaze of yellow—tall yellow flowers waving on their long stems amidst a luxuriant growth of *Euphorbia*, the latter also in full yellow flower. This mountain path is a wonderful sight at this time of year; many varieties of small flowers cling to the stony soil, and though the journey is a fatiguing one, it would well repay any botanist to visit this locality.

It was not until we had dismounted and commenced the descent down the zig-zag track, that I realised what a path we had just followed—hewn out of the side of the rock. Some idea of its grandeur can be gathered from the accompanying illustration. The precipice falls away many hundreds of feet to the plain below; at the highest point



A Dangerous Path above Aldea.

the path overhangs the edge, so that a stone let fall from one's hand would descend perpendicularly without touching rock or soil. From twenty yards away it is impossible to see any semblance of a path, and mounting this same track the following day, although I knew a path wide enough for mules to pass was supposed to be there, I could not make out even the barest outline. The mule is indeed a wonderful beast, but I would advise anyone going this journey to make sure that the animal he rides both knows the path and is really sure-footed, otherwise his journey will not be entirely one of pleasure.

At this altitude it often rains in the winter months, and as bad luck would have it, I had chanced on a particularly unfortunate week. As we crawled along (mules are the slowest creatures on earth going downhill—even our fine beasts were slow then, though they climbed like cats) we were suddenly aware that a storm was upon us. The clouds were almost down to the path over which we had just come, and with a roar the wind swept from the mountains, whistling and shrieking amongst the crags. The rain came down in sheets, and in a moment the mule path, over which we had still a long way to go, became a little torrent, the water coursing cheerfully over our boots, making the track slippery for the mules and abominably sticky for us, so that we were soon carrying enormous lumps of earth on our now very weary feet.

The rain ceased as suddenly as it had begun, but enough water had fallen on the slopes above to keep the little rivulets running along our path. The light was now beginning to fade, and as much of the track had been obliterated except to the experienced eyes of Vicente, our progress was anything but fast. It was with a sigh of relief that we finally threaded our way down the last little *barranco* which leads from the tableland beneath the

risco to the valley of Aldea, and emerged amongst the little farms which we had gazed down upon a couple of hours before. We had still to cross the big *barranco*, which we found to be in flood. I was amazed to see so much water; there were three separate channels coursing down the *barranco* bed, the widest of them quite thirty feet in width. The mules waded in calmly enough, but hesitated when they found that the water rose above their knees and was running with considerable force, doubtless sweeping pebbles against their feet. Indeed, I believe it is the rocks swept down by the stream which constitute the chief danger to mules crossing a *barranco* in flood, as they are sometimes knocked off their feet by a boulder.

It happened to be carnival time, and though much of the Spanish ardour must have been damped by the weather, we were soon being escorted by a number of fair figures — cloaked and heavily masked — who danced and wailed down the village street, and thus heralded our entrance to their domain with becoming pomp and dignity! Placed at my disposal was a nice clean two-roomed cottage, roofed with bamboos, supported on heavy beams let into the ground. It stood by itself just out of the village, and here I stayed for two nights, intending, if the weather cleared, to proceed up the Barranco de Aldea to Juncal, when I could visit my old camping ground, obtain some more Pied Woodpeckers, and perchance, if fortune favoured me, again have an opportunity of observing the Canarian Blue Chaffinch in its restricted home amongst the pines. Thence I intended to journey to Tejeda, the fascinating village locked away in the mountains, which, on former expeditions, I had looked down upon from the heights which surround it. From Tejeda my plan was to cross the Cumbres and traverse the Pinar de Tejeda, journey-

ing thence to Galdar through that belt of the pine forests which I had not yet visited. I have explained my plans at length, as I believe this to be one of the most interesting journeys which an ornithologist can make in the island. He would have an opportunity of observing the bird-life of the pine forests and of the valleys, for here are some of the finest *barrancos* in the island; and last but not least such a journey would afford views of perhaps the grandest scenery in Gran Canaria. To my lasting regret, instead of clearing, the weather became worse and worse, so that had I ventured to complete my programme, I should probably have remained in dense cloud from the moment we reached 2000 feet. As Juncal lies at 3600 feet and the route through the Pinar de Tejeda passes over still higher ground, I should then not have seen anything at all. Birds are scarce in the "Pinar" even on a fine sunny day, when the atmosphere is so clear that one may see for miles, and even then a sharp look-out must be kept if the traveller hopes to see all he has set his heart upon.

We passed a stormy night at Aldea, the wind increasing in violence and more than once heavy rain storms beat against the walls of my little house. Come what might, I had set my heart on securing six Partridges before leaving the neighbourhood altogether. At eight o'clock, therefore, Vicente arrived with the mules, and we set out once more on the long climb to Tirma, where I intended spending the entire day. As the greater part of the way was uphill, we made better progress than on the journey down, and two hours after starting we were once more creeping along the face of the *risco*, having ascended 2000 feet by my aneroid. Another three quarters of an hour brought us to the Partridge ground, and having persuaded a villainous-looking, black-bearded man to leave his troglodytic dwelling, dug out

of the face of the rock, and to take charge of the mules, we once again set out to scour the slopes, *barrancos* and boulder-strewn hill-tops in search of the coveted bird.

Whether it was the weather—it was exceedingly cold and every now and again we were hidden in driving mist, or else caught in a short heavy shower—or just bad luck, I know not, but though we tramped until we had almost worn the soles off our boots, from 11 A.M. until 3.30 P.M., I only had two shots and secured two birds. Several times a Partridge got up and flew in a direct line with Vicente's head, thus preventing my firing at it, while Vicente, armed only with my .410 bore gun and dust shot, could hardly be expected to bring down such a large object. Luck was certainly against us, and more than ever I regretted not having brought a trained dog—the lurcher which I had borrowed in Aldea, though doubtless a marvel after rabbits, of which I only saw one, proved quite useless with winged game, and I longed for my two little spaniels at home, who I feel certain would soon have provided some sport. On this occasion I flushed two Thick-knees, or "*Alcaravans*" as they are called in the island, but the birds were too wily to admit of near approach.

Once more we mounted our mules and started back for Aldea, having left ourselves only two and a half hours before dark. Another stormy night followed, when even the cow and the donkey in the adjoining "lean-to" found sleep impossible, and spent the early hours attempting to get into my bedroom by kicking a hole in the wall. At daybreak the rain came down in torrents, and when I looked out of my hut door I saw that the journey to the "Pinar" and to Tejeda must be abandoned; although the sun was now shining, the mountains were entirely hidden from view, and when Vicente arrived for instructions, he had a terrible tale to tell of the weather

in the hills. There was nothing to be done but to return to Galdar along the road we had come. At any rate, I could have one more try for the Partridges, and though bitterly disappointed I comforted myself with the thought that I might after all get my six "Red-Legs" and thus redeem the expedition from failure.

As we rode out of Aldea for the last time, the sun came out and the clouds lifted for a few brief minutes from the mountains, affording me a tantalising glimpse of the pine forests. Over the village a number of Brehm's Pale Swifts—not long arrived in the island—were dashing to and fro. A Kœnig's Shrike sat and uttered its peculiar note from the top of a fig-tree, and a Kite sailed serenely overhead, not a feather ruffled by the high wind which was blowing. Apart from Spanish Sparrows and Kestrels, birds were not by any means common in the Barranco de Aldea, but this again may be attributed to the unusual and villainous weather. The thought of the long ride ahead of us—there would be no motor in which to cover the last part of the journey—and the knowledge that we had to hurry if we hoped to get any more Partridges, spurred us on to Tirma as fast as the mules could carry us. As we crossed the *barranco* we realised how heavy the rain must have been in the hills; the water had risen considerably in the night and now almost reached our stirrup irons, wetting the bellies of the mules, and causing them to snort with anxiety as they gingerly picked their way across. Before we reached the great *risco* the sun was shut out from us by a heavy bank of cloud which again crept down the mountains, hiding from view what must be a magnificent panorama on a fine clear day. Though the weather was against us the gods had not quite deserted me, and on this ride back to Galdar I was lucky enough to get two more

fine Partridges, thus fulfilling my desire for six skins with which to decide the momentous question when I returned to England—*i.e.*, whether the Red-legged Partridge of Gran Canaria must be considered a distinct race.

The journey back to Galdar was uneventful. The mules insisted—as mules always do insist—on walking as near to the edge of the precipice as they possibly could, but apart from involuntarily leaning to the opposite side of the “drop,” I “sat tight” and the animal never faltered. Certainly the track is very narrow, but my friend at Galdar makes the journey often on moonlight nights, riding the mule which he so kindly lent to me, a journey which I cannot honestly say I should relish, though fraught with little danger in the daytime provided that one is on a really reliable animal, and that a landslide does not occur.

At last we left the mountain track, and once more gained the *carretera*, which from Agaëte to Galdar is exceptionally good. Leaving the main road we took a short cut over the arid plain, and despite the distance they had already gone, the mules broke spontaneously into a comfortable canter. To the west the sun was setting just south of the island of Tenerife, throwing the outline of the Pico de Teide into strong relief. The mountains behind us stood out rugged and dark beneath a canopy of clouds, which, as the sun dipped behind the horizon, suddenly became suffused with a beautiful shade of pink. At such a time the baked earth, of which the plains are composed, takes on a curious red glow and the whole effect is then most striking. Darkness fell long before we reached Galdar, the lights of the houses popping up one by one as we once more joined the *carretera* and jogged quietly up the hill into the little township.

CHAPTER XI

AN EXPEDITION TO THE ISLAND OF GOMERA

FROM several points of view the island of Gomera held out attractions to an ornithologist, and although I had originally planned to make Palma the chief objective of my expedition, I was quite content to give up any attempt to land in that island when I heard of the fate meted out to recent arrivals there. The island of Palma is not a land of cannibals, as might be inferred from the previous sentence, but in reality is a great deal more "civilised" than Gomera, boasting even a British Vice-Consul. Howbeit, the islanders live in the most deadly fear of "Spanish influenza," and hearing that the natives of Gran Canaria and Tenerife were "dying like flies" of the dreaded plague, the people of Palma determined not to admit the scourge into their own island, and taking the law into their own hands, refused to permit passengers or even merchandise to be landed in Santa Cruz de la Palma. The story reached me that two unhappy individuals, having succeeded in landing, were straightway flung into the sea by the hospitable islanders. Our decision was confirmed by a letter from the Vice-Consul, begging us for the present not to attempt to land, as we should "most certainly be stoned." It was, therefore, to the island of Gomera that we set out on the night of the 14th of March 1920, sailing from Santa Cruz de Tenerife in the *Leon y*

Castillo, one of the largest of the comfortable inter-insular boats which now ply between the principal ports in the Canary Archipelago.

Shortly after daybreak the following morning the little steamer was lying off the village of Santiago, a mere cluster of houses built amongst some palm-trees in a *barranco* on the southern coast of Gomera. Green but treeless hills rose steeply from the rugged cliffs which here form the coast-line. Having disembarked the few passengers for this tiny port, we steamed for half an hour close under the lee of the island to San Sebastian, the principal port of Gomera. Here the high cliffs drop away abruptly to the mouth of a wide *barranco*, where a heavy surf has piled up a stony beach, in places ground by continuous pounding to a black volcanic sand. San Sebastian viewed from the sea is not unpicturesque, numerous date-palms helping to relieve the otherwise treeless scene (see accompanying illustration), but on closer acquaintance what little beauty it possesses is soon dispelled.

A narrow fringe of tamarisks bounded the foreshore, immediately beyond which a certain amount of cultivation had been attempted. The village is built on the east side of this valley, and consists of three long parallel streets, stretching from the shore for about half a mile up the bed of the *barranco*. A few houses are built above the others on the eastern slope of the *barranco* wall, but are for the most part exceedingly poor and miserable. The buildings are variously coloured, but all have red roofs, and, viewed from a distance, the general effect is not unpleasing.

Having been carried ashore on a man's shoulders from the surf boat, and dumped with our various belongings on the stony beach, we at once became the centre of attraction of the motley crowd which had



The Landing-place, San Sebastian, Gomera.



Hermigua Alta—terraced banana plantations.

gathered to watch the arrival of the boat, and it was with no little relief that we escaped up the villainously cobbled street to the house which had been placed at our disposal. The first impression which we had formed of San Sebastian was not dispelled when we became better acquainted with it. It compared very poorly with many villages in Gran Canaria and Tenerife, and certainly is far inferior to Arrecife or Puerto Cabras, the chief seaports of Lanzarote and Fuerteventura. I know of few places so entirely shut away from the world, and which convey such an impression of complete isolation.

The steep sides of the *barranco*, which bound the village on the east and west, were certainly greener than I expected—a coarse weed growing between the stones and on the lower slopes; the usual terraces had been constructed, upon which the exceedingly meagre crops are reared. The valley stretches inland for a considerable distance, and is then hemmed in by high mountains, which have to be crossed in whichever direction the traveller desires to go. The bed of the valley is principally taken up by a wide dry water-course, or rather by a series of channels filled with large water-worn boulders, but near the village, and again half a mile up the *barranco*, the stony ground is enclosed with walls, and crops of tomatoes are grown, which eventually find their way to Covent Garden market. Apart from the date-palms in the neighbourhood of the beach, there are no trees whatever until the tomato fields are reached some distance from the sea. Here groves of lemon-trees with their dark green leaves make a pleasant contrast to the Euphorbia-covered slopes of the hill-sides. Amongst the higher rocks a curious fleshy-leaved *Sempervivum* was growing in thick clusters, while many plants of *Euphorbia canariensis* clothed the uppermost heights of the *barranco* walls.

Wishing to obtain a panoramic photograph of the valley and little township, I crossed the *barranco* bed and walked along the shore, climbing a short way up the western wall of the valley. The sun was sinking low in the west, and shone with full evening brilliancy on the snow-clad Peak of Tenerife, transforming an otherwise ordinary scene into one of extreme beauty. In the foreground lay the dark green tamarisks and feathery date-palms, beyond which the red roofs and variously coloured buildings of San Sebastian appeared bright and attractive against the drab-brown hill-side. A tearing wind was sweeping down the valley, causing the blue waters of the tiny bay to dance with myriads of "white horses." In the distance the outline of Tenerife was plainly visible, capped by the wonderful white Peak.

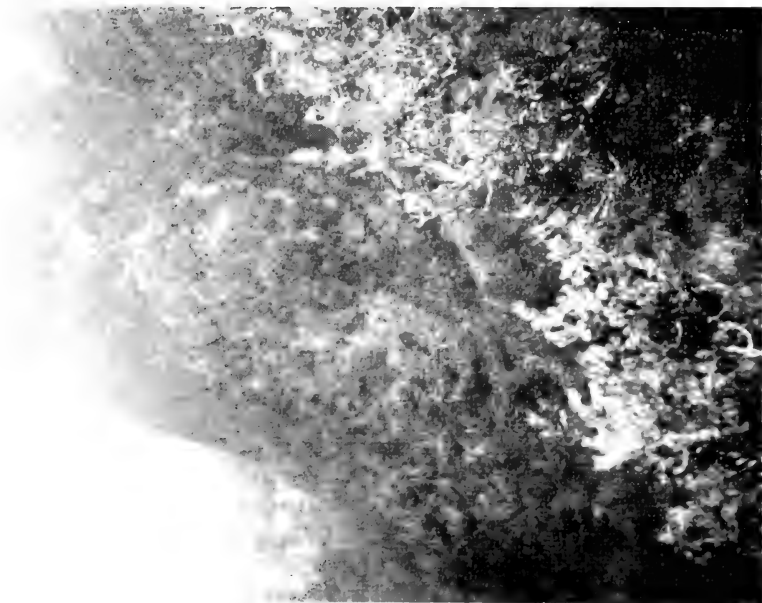
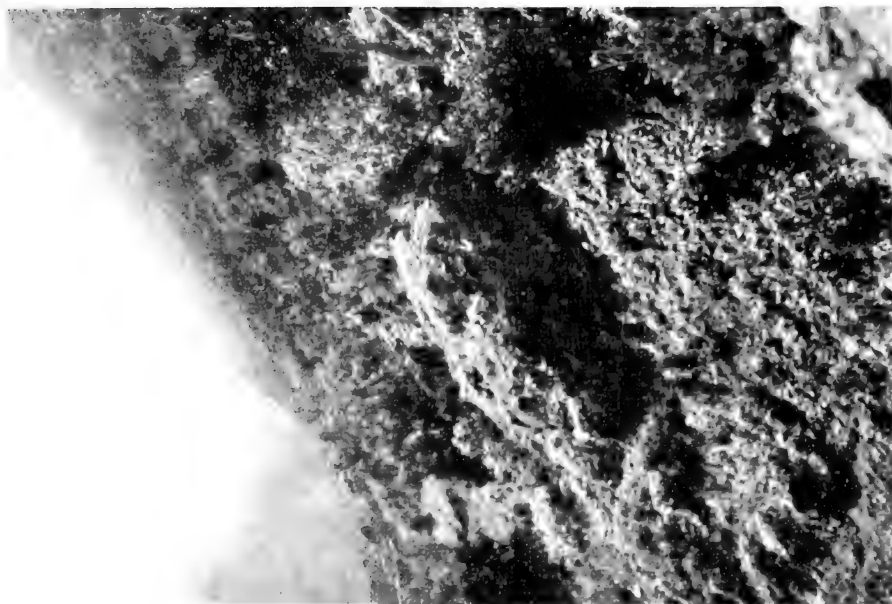
From an ornithologist's stand-point the valley of San Sebastian is terribly disappointing, birds being very scarce and confined to a few species only. On the sea cliffs a Heron and a few Yellow-legged Herring-gulls were seen, while on the beach a pair of Lesser Ringed Plovers were the only members of their family present. In the narrow belt of tamarisk scrub, one or two Hoopoes and a Spectacled Warbler were hopping about, while a Kestrel had its abode in one of the palm-trees where the arable land begins. In this desolate valley there is only one bird which can be called really common, and that is the Raven; quite a number of them were generally to be seen flying in pairs along the face of the cliffs or else congregating in small flocks on the steep *barranco* sides. High overhead two or three Egyptian Vultures kept a watchful eye for carrion, of which, judging by the smells in the village street, there could have been no lack. It was possible to walk from the village of San Sebastian to the tomato *fincas*, nearly a mile inland, without so much as seeing a single bird

save the ever-present Raven. Indeed my first excursion in this direction produced only a Spectacled Warbler, a Sardinian Warbler, and a Hoopoe, but I later discovered that Chiffchaffs and Goldfinches were not really rare amongst the lemon-trees, and also noted a Grey Wagtail, two Rock Pigeons, and two Berthelot's Pipits. Not a very thrilling list, to say the least of it. If one ascended the *barranco* sides the prospect was no more alluring. As far as the eye could see, the hills were bare of trees. Above the cliffs the stony land was sown with bearded-wheat, and here one large flock of Rock Sparrows was found. I know of few birds more difficult to shoot than the Rock Sparrow—its protective coloration makes it absolutely invisible until it rises from the ground, when it flies swiftly and low, taking any cover available, generally in the shape of lava walls or Euphorbia bushes, and never settling on any conspicuous object.

Unfortunately, circumstances kept us in San Sebastian for three whole days and nights, the latter made hideous by howling dogs and a tearing wind which never ceased to rattle every door and window in the village; but at last our arrangements were complete, and we set out on two miserable ponies—the best we could procure in San Sebastian—to cross the island to Hermigua. As the crow flies the distance is not far, but in the Canary Islands distances must rather be gauged by the altitude to which one must ascend, and this is particularly the case in Gomera. We left San Sebastian and our kind host—Don Telesforo Ascanio—at 10 A.M., and followed the big valley which here runs almost due west, the bed of the *barranco* gradually ascending to 800 feet. The precipitous sides of the valley were remarkably green, doubtless the result of the torrential rains which had recently fallen, while the

wild flowers growing amongst the rocks and grass were here particularly numerous—dandelions with dark green centres, wild cinerarias, poppies, and various kinds of which I know not the name. The only tree of any size was the indigenous *Phoenix dactylifera canariensis*, quite a number of which, in various stages of development, were to be seen in the valley. Several small farms were passed, where the land was sown with various cereals, the wheat, poor in quality, growing on terraces roughly constructed out of the numerous rocks and stones which everywhere covered the ground.

We had now reached the head of the *barranco* and were completely shut in by mountains. It seemed as if no path could be found over such steep ground, and with considerable forebodings that we should find our ponies incapable of the ascent, we commenced the arduous climb. From 800 feet the path wound upwards at a very steep angle, and at 1600 feet we entered a low scrub of giant heather (*Erica arborea*), which grew thicker and finer as we rose. From this point we found it impossible to ride. Had the animals been in better condition I should have been very loth to dismount, but as it was we had little choice in the matter. The giant heather covered all the mountains above the altitude we had reached, up to the very summit of the high ridges, 4000 feet or more above the sea. I had never seen such heath before and was greatly struck by the great height to which it grows. Meade-Waldo, who travelled extensively in the Canary Islands between 1888 and 1891, remarked that the heaths and evergreen trees of many kinds in Gomera were far larger and more luxuriant than he had met with anywhere else in the Islands, a statement which doubtless holds good at the present day. The heather was not properly in flower, but some of the trees seemed more advanced than the



In the Mountains of Gomera, 4000 feet.

rest, and we passed several covered with the pretty white bloom. The woods must be a wonderful sight later in the year. Amongst the heath we noticed quite a number of other evergreen trees, the commonest of which was the Faya tree (*Myrica Faya*), called by the natives "*haya*." The Canarian holly (*Ilex canariensis*) was also noted, while another rarer tree was very similar to the Faya in appearance but had lighter coloured leaves, and has not been identified satisfactorily.

Between 2000 feet and 3000 feet the track wound less steeply up the mountain-side, affording magnificent views of the high ridges which we were now fast approaching. The heather became denser, the individual trees finer, the rocky sides were everywhere covered with curious vegetation, the most noticeable being a remarkable plant in the shape of a large rosette, not unlike a Jerusalem artichoke, and which has since been identified from specimens obtained as *Æonium canariense*. As in Tenerife, these remarkable rosettes cling in numbers to the face of the rock in the higher altitudes of the Cloud Region, and exhibit great variety in size. Another striking plant which attracted our attention was a *Sempervivum* clinging in tiny grape-like clusters to the rock crannies. The vegetation at this altitude was wonderfully green, the undergrowth, mosses, ferns, and flowers, particularly luxuriant. The ascent zig-zagged up to 3000 feet, when we passed abruptly over the ridge and gained another extensive view beyond. The clouds were now beginning to roll down the upper slopes, obscuring the highest crests, but in all directions the mountains were clothed in a rolling mass of heath, even finer specimens than we had yet met with. Unfortunately, the sun had long been obscured by cloud, so that the views here reproduced (facing pages 236 and 238) are not as clear as would

otherwise have been the case. From the ridge which separates the great valley of San Sebastian from the rest of Gomera, we gained a good idea of the inaccessibility of this comparatively small island, only some 16 miles long and 13 miles broad. Almost from the same point we could gaze down into the two great valleys, the one up which we had passed running east and west, the other—the valley of Hermigua—almost north and south. As usual, the descent was worse than the climb up, and we were forced to lead our beasts almost the whole way down. We dipped almost immediately into the fine woods, and even had the sun been high overhead would have been walking in the shade, so wonderfully luxuriant was the heather growth at this point. The atmosphere smelt damp and heavy, tiny rivulets ran down in little cascades, the ground beneath the heather was everywhere carpeted with mosses and ferns. Eagerly I listened for the note of any of the birds I had come so far to find—the Laurel Pigeons, the Pale Redbreast, the Tenerifean Goldcrest, or even the Canarian Chaffinch. Surely it would be difficult to find a more inviting retreat in which, at any rate, the last three mentioned, and certainly the island Blackbird, should have had their home. Absolute silence reigned, not a bird was in sight! I have ridden many miles in the Canary Islands in search of birds, but I never remember such a disappointing journey (from the point of view of the bird-life observed) as this proved to be. In the valley of San Sebastian I had found birds exceptionally scarce, but put that down to the great lack of vegetation in this very uninteresting locality. But now we were passing through really fine evergreen woods, a sufficiently wonderful experience in the Canary Islands to warrant the highest hopes rising in an ornithologist's breast!



Amongst the Giant Heaths in the Mountains



In the Mountains of Gomera, looking



Mountains of Gomera, 3000 feet above the sea.



Looking down the Valley of San Sebastian.

That the highlands of Gomera are undoubtedly tenanted by two magnificent Pigeons (*Columba junoniæ*) inhabiting Palma and Gomera and nowhere else in the world, and *Columba bollei* restricted to Gomera, Palma, and Tenerife), we know to be true; while on a journey from San Sebastian to the Valle Hermosa undertaken by Meade-Waldo in 1888 when practically if not exactly the same path must have been followed, that ornithologist had met with Sardinian Warblers, Blackbirds, Titmice, Thrushes, Goldcrests, Linnets, Goldfinches, Chaffinches, Woodcock, and Rock Partridges, a sufficiently varied list to satisfy the most ardent naturalist. The highest point in Gomera is said to be only 4400 feet above sea-level, and we had therefore passed within 1400 feet of the top of the island without seeing a single one of the species mentioned. It may be of interest here to note that as soon as my object in visiting Gomera was made known to the good folk of San Sebastian, I was told that I had come "too late" for the small birds, as all had disappeared since the terrible five weeks of heavy rain which had only ceased a week before my visit; moreover, that I had come "too soon" for the Pigeons, which had all retreated to the highest points in the island (now quite inaccessible, since the path-destroying rains), where they would remain until August and September, when they would descend to the lower slopes and feed on the grain and fruit. I secretly determined to ignore these objections, and, come what might, secure, or at any rate see, in its native haunts the "*Rabichi*" (*C. junoniæ*) and the "*Turquesa*" (*C. bollei*)—plans which were once more frustrated by the ill-luck which followed me on this expedition.

The long climb down to Hermigua took us much longer than the ascent. We continued to pass through evergreen woods, which gradually became thinner and

more scrubby as we descended to a lower altitude, and finally we passed out of the heather zone altogether. It was then that we came upon a type of country which we had not seen before in our journey, it being different from the lower slopes of the San Sebastian valley. It was much more attractive to bird-life, and certainly very pleasant to the eye. The little rivulets which came tumbling down from the higher mountains now joined to form fast-running mountain streams, along the banks of which bamboos grew in profusion : masses of brambles clothed the hill-sides, and grasses and flowers of many kinds were observed. A more ideal place in which to expect to see Blackbirds and Redbreasts it would be hard to find ; one of the former birds was seen by a muleteer as it dived into a bramble bush, but the Redbreast was neither seen nor heard. Chiffchaffs, however, were numerous, and Kestrels and Rock Pigeons were occasionally seen. As we neared Hermigua Alta, the valley became closely cultivated with maize and other cereals ; lemon and fig-trees and a few almonds made their appearance, and palms were growing on all sides. Passing through the cobbled village street, where we were again forced to dismount owing to the steep gradient, we were surprised to see a fine Buzzard pass overhead, holding an enormous rat in its fully outstretched talons—a sight sufficiently rare to excite even the interest of the natives, who stood and gazed at the great bird as it sailed away with its heavy burden, holding the body of the rat by the middle.

Hermigua Alta lies some way from the coast, about 1000 feet above the sea, and as the room which had been lent to us was in a fruit packing store almost on the beach, we had still some way to go. A swift stream was running down the middle of the valley, rushing over the boulders in a swirling torrent, almost reminding one

of a Dartmoor trout stream. The illusion, however, was dispelled by the banks, lined at intervals with bamboos and coarse vegetation, while every available space from Hermigua Alta to Hermigua Playa was covered with banana trees. The valley of Hermigua is certainly one of the most cultivated I have seen in the Islands (see illustration facing page 248). It is almost enclosed by very steep mountains rising at their highest points to 4000 feet, and even the *barranco* sides are terraced to a considerable height, sown with beans and corn, above which the endemic Euphorbias, coarse grass and cattle-weed, give the mountain-sides a wonderfully green appearance. Smaller *barrancos* cut up the main walls of the valley, and here many hours were spent searching for birds, with, unfortunately, very little success. The mountains near the sea do not bear any heather, but only those at the head of the valley, as already described. Despite these, one would imagine alluring conditions, birds were really scarce—Chiffchaffs, Blackbirds, Canaries, Kestrels, and Wagtails were literally the only species seen, though I hunted high and low amongst the bananas, bamboos, brambles, palms, and corn terraces. The mouth of the valley is about half a mile broad, steep cliffs rising on either side. The beach is stony; the sand black and volcanic. Beyond high-water mark, a thick but narrow fringe of tamarisk bounds the banana plantations, which extend even on to the foreshore. The stream which we had followed down the bed of the valley, here emptied itself into the sea, passing between a luxuriant growth of bamboos. A rough path led from the packing sheds for a short distance along the cliffs, and it was a picturesque sight to see the camels carrying the great bales of fruit to the *pescante* for shipment in small coasting vessels to Tenerife, whence the fruit is transferred to the larger steamers

which carry it to England. The cultivation of bananas in the Canary Islands has been greatly developed of recent years by a well-known British firm. Tenerife and Gran Canaria are the principal gardens for the bananas, but many thousands of bunches are now produced in the islands of Palma and Gomera. I have already acknowledged in the "Foreword" to this volume my indebtedness to members of this firm. The kindness and courtesy received from Messrs Fyffe's staff, both English and Spanish, could not have been exceeded, and special thanks are due to Mr C. J. Hamilton for the arrangements he made for our stay in Gomera.

It was my great desire to reach the highest ground in the island where I knew I should meet with the Laurel Pigeons I had set my heart on securing, but once more the elements turned against me. The heavy clouds which had descended over the mountains as we journeyed through the heather zone, failed to lift on the following days, and instead sank lower and lower, enveloping everything above 3000 feet in a thick grey mantle. From Hermigua, at any rate, the ascent to the Pigeon ground was impossible without a tent, which, for various reasons, I had been obliged to leave in Las Palmas. Indeed the old lesson which I learnt in Gran Canaria was once more brought forcibly before me—*never travel without a light tent*, it is indispensable.

Instead of ascending to the high ground, I had to content myself with a day after the Rock Partridges, which have the reputation of being plentiful in Gomera. Curiously enough, the Partridge of Tenerife and Palma (and Lanzarote, where it is very rare) is a Pale race of the Barbary Partridge, and is known as *Alectoris barbara kaenigi*, but in the island of Gran Canaria the much smaller "French" Red-legged Partridge is found and is represented by the perfectly distinct race

known as *Alectoris rufa australis*. In the island of Palma no Partridge has ever succeeded in gaining a footing, though I understand it has been frequently introduced from Tenerife and Gomera. As there is plenty of suitable ground for a Rock Partridge in that island, its failure to thrive there is another of those problems of anomalous distribution of which we have such remarkable instances in the Canary Archipelago. Although the Canarian Rock Partridge, unlike the Gran Canarian "Red-Leg," is not by any means rare, we had few specimens of this island race in the British Museum, and I therefore welcomed the opportunity of securing further examples. Accordingly I set out with my Spanish guide for some likely ground, distant about an hour and a half's ride, mounted on the best pony I have ever ridden in the Canaries. We scrambled up the bed of a *barranquillo*,¹ and then ascended the eastern side, our beasts climbing up the most villainous path till we were 1000 feet above the banana plantations, where a fine view was obtained of the valley and several photos were secured. We then followed a perilous track, which for fifty yards ran along a razor-backed ridge only just sufficiently wide for the pony to walk on, with a rolling drop of many hundred feet on either side. I was glad I was mounted on a very different pony from that which had carried me over the Cumbres from San Sebastian! The path kept parallel with the coast, keeping much at the same elevation, the mountains on our right rising to a considerable height. After riding for an hour and a half we came to a stretch of more open country, the hill-side sloping more gradually to the sea-cliffs, the whole covered with immense boulders half covered in vegetation, principally high thistles, reaching to one's knees, brambles, coarse grass

¹ A little *barranco*, or ravine.

and evergreen plants, plentifully mixed with wild flowers, dandelions, cineraria, etc. Specimens of *Senecio cruentus* were obtained on this ground. The Rock Partridges were found here in some numbers, and we had fair sport, a pointer, "Sol," which we had with us, helping us considerably. The Canarian Rock Partridge is a fine bird on the wing—the male utters its call when flushed and it flies very strongly. Provided that one does not overbalance on the uneven ground just as the game is flushed, there should be no difficulty in bringing down one's bird. The only other species seen on this rock-strewn ground were Berthelot's Pipits and Spectacled Warblers. Having secured the Partridges I required, I next climbed up a dip in the mountains, closely overgrown with coarse vegetation, until at 1600 feet I once more entered the giant heather scrub. Two tiny birds were dodging about in a low bush, and thinking I had at last discovered the Tenerifean Goldcrests, I shot them at sight, but to my annoyance found they were both Chiffchaffs. Later I found that Chiffchaffs were common here, but save two Blue Titmice and one or two Canaries just below the heather, no small birds were noted. The mists hid the hill-tops, from which occasionally Rock Pigeons would drop through the clouds, like stones, on their way to the sea-cliffs, or to feed on the meagre corn in the neighbourhood of the one tiny farm. Unseen Ravens croaked far overhead, suddenly appearing for a moment like ghosts through the fleeting mist, only to disappear from view as they once more passed into the clouds.

The unexpected arrival of a small fruit "coaster" on the morning of the 19th decided us to return to Tenerife in two days' time, the little boat promising to pick us up on her return journey from Valle Hermoso. The alternative was to take a rowing boat round the

coast to San Sebastian to catch the inter-insular steamer, which would have taken three days to make the trip to Santa Cruz, wandering half way round the Archipelago *en route*. A journey in a small rowing boat round the coasts of any of the Canary Islands is not to be lightly undertaken, even by a good sailor; both embarking and disembarking are often exceedingly difficult, and in rough weather quite impossible. In the winter months choppy seas are of only too frequent occurrence, and as the islands—especially Palma, Gomera, and Hierro—rise very precipitously from the sea, their coasts are greatly exposed to the fury of the waves and few harbours worthy of sheltering even a small vessel are to be found. Viewed from a ship at sea, Gomera does not present a very alluring appearance, and only in the interior of the island does any virgin forest growth exist, and that at a considerable altitude. The difficulties of exploring the interior are increased tenfold by the lack of suitable beasts of burden. In San Sebastian, where the traveller is usually compelled to land, mules are unprocurable, and the ponies, judging by those which we obtained, and said to have been the best available, are such miserable specimens that they would be incapable of transporting tents and other camping outfit up the mountain-paths without being subjected to real cruelty—cruelty which the Canarian Spaniard is unfortunately only too ready to inflict. We got over this difficulty by sending our baggage by boat and riding with nothing but guns and cameras across the island; but this method of collecting is not to be recommended—little can be done on a long journey; the noise made by ponies and men passing through the usually silent woods is sufficient to frighten every bird for miles round. The only sure plan is to camp on the actual ground to be explored.

It is then possible to be out very early in the morning when birds are feeding, and also at dusk when species, such as the Woodcock, "flight" from one place to another and are then easily obtained. Living on the shore, as I was compelled to do, the best part of the day was lost in getting to the ground I desired to work over, and getting back before nightfall, the mountain-paths being very unsafe at night for either man or beast unless the moon should chance to be full.

In the pages of this book I have dealt very little with the customs of the present-day inhabitants of the Islands. Apart from the troglodytic life which some of the natives lead by force of circumstance, there are few traits worthy of particular note. There are, however, one or two customs which the Canary islanders may well claim as their own, and of these the "whistling language" practised in Gomera is, I believe, quite the most remarkable, as it is also unique throughout the world. Unfortunately I was unable to visit that district in Gomera where the best whistlers are said to reside, the Montaña de Chipude. The townfolk apparently have no knowledge of this language, but in many of the country districts it is said to be sufficiently developed for messages to be sent and for limited conversation to be carried on. Whether or not our muleteers were exponents of this art I was unable to prove to my satisfaction, but certainly as we passed some way below a farm on the opposite hill-side, a curious whistle rang out from a small group of peasants gathered to watch us pass by. The whistle was immediately answered by one of our men, and I was at once struck by the peculiarity of the notes—low and liquid but very clear, reminding me more of certain notes used by the Nightingale than of any human whistle I had heard before. The notes, four or five in

number, were rather drawn out, the one running into the other without any perceptible stop between them, though the intensity of tone of each note was perfectly distinct from the next. It may be that the curiosity of the natives at the unusual sight of an Englishwoman riding astride down their mountain-paths had been excited, and that they had whistled to our guides to know who we were, whence we came, and whither we were going? The answer they received certainly appeared to satisfy the interrogators, for the whistle was not repeated. It would certainly be worth the while of an ethnologist to visit Gomera for the express purpose of investigating this unique whistling language. It will be a thousand pities if the language is permitted to die out before some investigation of the kind has taken place.

True to promise, the little fruit steamer *Taoro* put in to Hermigua on the morning of the 21st of March. A leisurely camel arrived for our baggage and we set out for the cliffs from which we were to embark. My wife and I have experienced many ways of landing and departing from the coasts of the Canary Islands—sometimes we have been carried through the surf high on men's shoulders and "tumbled" unceremoniously into a small boat, or else again we have had to spring for a cliff, being caught by the wrists by brawny fishermen and hauled out of reach of the waves—but the method employed at Hermigua for embarking fruit and passengers is unique in our experience. A good path has been cut along the face of the cliff which leads to a fruit shed built on a stone platform on the cliff-side some hundred and fifty feet above the sea. From this platform a skeleton iron structure, supported by a stone buttress, extends a considerable distance over the waves, and along these iron rails runs a mechani-

cally propelled cradle supported by a single rope (see accompanying illustration). The cradle, when filled with the bales of fruit by the loaders on the landing-stage, is then swung into the air, run along the rails out over the sea, and lowered to a small boat which waits beneath. We were not the only passengers who had taken the opportunity of escaping from Hermigua. The small landing-stage on the cliffs was filled with men, women, and children emigrating to Cuba, and these had all secured a deck passage on the *Taoro* to Santa Cruz. A great many men emigrate annually from the Canary Islands to Cuba, hoping to make their fortune there in a few years. If married, their wives and families are invariably left behind in the Canaries until such a time as the husband has made sufficient money to send for them, always provided of course that he has not found another wife across the seas. One woman with a small boy and two little girls, whose husband, wonderful to say, had remained faithful to her, was thus setting out, carrying with her all her worldly goods. The men all seemed quite unconcerned, but several women, come to watch the departure of their sons and husbands, lifted up their voices in loud lamentations: one old lady in particular, whose son took not the slightest notice of her grief, hung over the parapet and filled the air with piercing howls, waving her arms above her head in frantic gestures of despair. At last all the fruit was cleared and the emigrants' luggage was piled into the cradle. This caused considerable argument—none of the travellers wishing to be separated from their belongings. One young man steadfastly refused to allow his box to go without him, and just as the cradle commenced to rise from the ground, sprang upon the luggage and was hoisted into the



Banana Plantations in



The Landing-place, Hermigua, Gomera. Not



Valley of Hermigua, Gomera.



Landing basket with passengers for the s.s. *Taoro*.

air clinging to the rope. In this precarious position he was lowered to the boat, the cradle spinning round in a most dizzy fashion, but the young man, having achieved his object, was perfectly content. A wooden box with seats and very low sides was next substituted for the luggage cradle, and in this the emigrants, four at a time, and finally ourselves, were lowered to the waiting boat underneath. We were then rowed out to the *Taoro*, which we boarded by climbing up a rope-ladder. When all were aboard the *Taoro* blew her whistle furiously, the anchor-chain rolled up, and we slowly turned our back on Gomera, an island which locks up her ornithological secrets very tight in the heart of her most inaccessible mountains, and which I could not help but feel had treated me just a little ungenerously.

The voyage to Santa Cruz in the *Taoro* remains one of my pleasantest recollections. The little steamer made for the western coast of Tenerife until almost opposite the village of Guia, when she changed her course, steering south close under the shelter of the land. The day was one of the most glorious I can remember—perfectly still and peaceful, the sea like a mirror, a hot sun beat down, a curious grey haze hung over the water. The breeze made by the leisurely motion of the “coaster” as she ploughed through the waves was just sufficient to keep us delightfully cool on the bridge. We had left Hermigua about 2 P.M., so that half the voyage was made in daylight, and a fine idea was gained of the western and southern coasts of Tenerife. Viewed from the sea, the western coast presents a remarkable appearance. With the Peak almost obscured by cloud, the island resembles a hump, tapering at both extremities to fine headlands—Punta Teño in the north-west, Punta Rasca

in the south. The middle of the hump is taken up by the Cañadas, lying over 7000 feet above the sea, from which the snow-clad summit of the Pico de Teide rises another 5000 feet and more into the sky. South of the Cañadas the mountains fall in a series of precipitous parallel spurs, separated by deep *barrancos*, to the arid region of the coast. The higher ridges are clothed with pines, but viewing the island from a ship lying off Adeje, the impression gained is one of extreme barrenness. A journey on mule-back parallel with the coast is one incessant scramble up and down ravines, so that a rowing boat is usually the simplest way of getting from one village to another, saving both the time and patience of the traveller! From our vantage point on the bridge of the *Taoro*, the serrated nature of the island was particularly apparent; a few villages were to be seen dotted about the hill-side at varying distances from the beach, the majority appearing to be between 1000 and 2000 feet above sea-level. As we neared the lighthouse, built a little to the west of Punta Rasca, the *Taoro* steamed close in-shore, so near, indeed, that the wonderful semi-desert vegetation of this lonely belt could plainly be seen, and with powerful glasses even certain species of the various plants could be identified. The coast is here very low, black lava rocks fringe the shore, thickly covered with a bright yellow seaweed.

At high-water mark numerous caverns have been formed by the action of the waves, but nowhere is there any semblance of cliffs. Beyond the shore a flat, sun-baked plain stretches inland, broken only by a chain of hills, whose curious shapes, flat-topped, pointed or rounded, arrested attention. Immediately behind the lighthouse rises a low rounded volcano of that striking red colour so often seen in the craters of

these islands. On some Spanish maps this volcano is named the Montaña Pardela, from which I gather it is the resort in the breeding season of the Canarian Shearwater (*Calonectris kuhli fortunatus*). Both this and the much smaller Madeiran Allied Shearwater (*Puffinus assimilis baroli*) were to be seen on the water, the former quite plentiful, the latter decidedly rare. It is likely that both species come to this unfrequented part of the coast to rear their young. The "*Pardela*" or Canarian Shearwater, I knew from my experiences in the outer islets of the Eastern Canaries, to be fond of utilising the old lava caverns, so plentiful in the sides of almost all old craters.

We rounded Rasca Point and continued to hug the shore, much the same in character as that just described, *i.e.*, semi-desert, with low hills dotted here and there, in the distance the pine-clad ridges mounting higher and higher into the clouds. As we passed Punta Roja, we again altered our course to parallel with the long eastern strand of Tenerife, where headland follows headland in endless succession. A grey pall hung over land and sea, a lemon-coloured sun was sinking behind Gomera, throwing the outline of that island into relief. A solitary flying-fish leaped from under the bows of the ship and skimmed away over the surface. We passed whole fleets of *Siphonophora*—"Portuguese men-of-war"—sailing valiantly on their way, their sails a wonderful opalescent blue bordered with the brightest of pink. Shearwaters continued to pass the boat, all making in the same direction—their resting-place by the red volcano which bears their name.

As the sun sank out of sight, Tenerife as suddenly lost all its shape, appearing as a great grey mass, the white Peak just peeping through the gathering

gloom. The emigrant woman with the three children lying huddled on the hatch had now entirely disappeared from view, enveloped in a great blanket which covered the family from head to foot. The Spaniard at the wheel commenced to sing—chanting in a minor key of the past glories of Spain, when she ruled “from Buenos Aires to Peru.” One by one the lights of villages began to twinkle far up the mountain-side, and following the example of the emigrant woman, we rolled ourselves up in our coats, lulled by the motion of the ship and the droning song of the man at the wheel.

PART III

TRAVELS AND ORNITHOLOGICAL EXPEDITIONS IN THE EASTERN CANARY ISLANDS

CHAPTER XII

AN ORNITHOLOGICAL EXPEDITION TO THE EASTERN CANARY ISLANDS—FUERTEVENTURA

THE desert islands of the Canary group had long attracted me, both for their remarkable physical characteristics and for the even more remarkable birds which they were known to contain. The names of the two large islands alone—Fuerteventura and Lanzarote—had an interesting sound about them; moreover a small cluster of uninhabited and almost entirely unexplored islets, the bird-life of which was virtually unknown, lay off the northern point of Lanzarote.

I was quite certain that if I could only hit off the right time of year I should be amply repaid, in knowledge, if in nothing else, for the difficulties which a thorough exploration of these unknown islands and rocks would undoubtedly entail.

The primary object of the expedition was to discover which Petrels and Shearwaters resorted to the outer islets to breed, for although quite a number of these interesting sea-birds were reported to rear their young on the uninhabited islands of the Canary group, yet no ornithologist had ever visited them in the breeding season, and very little was known concerning them.

Plans were therefore laid in England, and it was arranged to visit at any rate the outer islets during the month of June, when it was hoped the Petrels would be discovered breeding. I had also set my

heart on seeing in its native haunts, and, if possible, securing a specimen of, the extremely rare Black Oystercatcher, one of the least known birds in the world, in quest of which several ornithologists had set out since Meade-Waldo obtained it in 1890, but which had never since been secured.

Unlike my previous trips in the Canaries, which had been purely private ventures, this expedition to the Eastern Islands was undertaken officially on behalf of the British Museum (Natural History), and it was owing to the kindness of Mr Ogilvie-Grant, then head of the Bird Department, and of the late Mr C. E. Fagan, the Secretary of the Museum, and to their interest in the expedition, that the plans were successfully laid and excellent results finally obtained.

The collecting of birds in the Canary Islands during the "close season" is prohibited, and although the rule is a splendid one, yet it is only enforced where *strangers* are concerned—the local "sportsman" being permitted to commit the most heinous crimes, such as shooting and trapping the birds whilst actually on the nest. However, where "foreign" collectors are concerned, the law is enforced, and for this, at any rate, we may be thankful, as the rule is only relaxed on very special occasions.

Owing to the intervention of Lord, then Sir Edward, Grey, permission was eventually obtained to collect birds in May and June, but even then further troubles arose locally, and but for the good offices of Major Swanston, H.B.M.'s consul at Las Palmas, we should have had to give up our project altogether.

The authorities of the British Museum had lent me their taxidermist, A. H. Bishop, whose assistance I found invaluable, and who was responsible for the 412 bird skins which we eventually brought back to

the National Collection, to the Royal Scottish Museum in Edinburgh, and to the Museum of Lord Rothschild at Tring.

At last all difficulties were overcome and we were ready to leave Gran Canaria for the Eastern Islands. As Spanish headman I took a useful Gran Canarian named Juan Barreto, and as cook a Spaniard by name José. The duties of the former were to act as interpreter and to make all arrangements about transport, both on land and sea. As my wife and sister-in-law, who were accompanying me, both spoke Spanish, I did not anticipate many linguistic difficulties. Eventually our arrangements were complete and we boarded the little insular steamer *Viera y Clavijo* at 8 P.M. on the 4th of May 1913.¹

Four hours later the *Corrèo* weighed anchor, and we steamed out of Las Palmas harbour about midnight on our sixty-mile run to Fuerteventura. Once beyond the shelter of the Isleta, the little boat began to pitch and toss, but luckily not badly enough to prevent our having a good night's rest.

We were awakened next morning at 5.30 by the sudden cessation of the engines, and thinking we had arrived at our destination, we scrambled up on deck to find we were lying off a tiny port called Gran Tarajal. It was a glorious dawn, and the island looked most alluring in the early morning light. There appeared to be only about two houses in sight, which were built on the beach at the entrance to an attractive valley or *barranco*, which led into the interior of the island. The bottom of the *barranco* was thickly lined with tamarisks, but the sides, which looked

¹ The official report of this expedition appeared in the *Ibis* 1914, Part I., pp. 38-90; Part II., pp. 228-93. The collections brought to England are now mostly in the British and Tring Museums.

steep and rocky, seemed absolutely bare of vegetation, as indeed was most of the land in sight. In the distance, beyond the tamarisks, a few clumps of palms added the picturesque note, which they always do to any scene, and above their feathery heads a low range of blue hills stretched into the distance.

A heavy surf boat was putting out from the shore as we came on deck, and we made out a string of camels kneeling patiently on the beach—apparently waiting for the goods which, with much creaking and groaning of the winches, were being hauled out of the hold of our little steamer.

We had no opportunity to land during this visit, for little time was lost before we were again under way, steaming up the coast-line parallel with the shore. The island appeared more mountainous than I had expected to find it, but looked remarkably interesting ornithologically. It was as unlike the Western Islands as one could possibly imagine, and I now realised for the first time the reason for its truly desert flora and fauna.

At 9.30 A.M. we anchored off Puerto Cabras, the principal "port" of Fuerteventura, and indeed, after Gran Tarajal, it almost deserved the name! The little township is built on the slopes of a hill, which gradually descends to the water's edge, and the cluster of ugly square white houses looked quite imposing from the deck of our steamer. A tiny stone mole runs out about a hundred yards into the sea, and as we drew near we discovered that it was packed with a seething mass of humanity. Whether the arrival of the boat always attracts such attention is a moot point, but probably the news that four English people—and two of them women—were coming to their island "to collect birds" had proved too much for the curiosity of the

good folk of Puerto Cabras. Doubtless Juan Barreto, who, like all good Canarians, loved to brag of his "friends" (as I later discovered we were affectionately termed), had not been idle since he had arrived in advance in the island, ostensibly to engage our camels and make the necessary arrangements for our speedy departure from the port of landing.

The camels—seven in all—each with its owner, were there right enough, kneeling down quietly on the mole, though entirely hidden from our view by the crowd which thronged around them. Our arrival caused the greatest excitement, and it was with difficulty that we made our way to where our animals and men were waiting. Our stores, tents, and other baggage took some time to land and longer still to load on to the camels, the drivers continually exchanging the bales with one another until the weight was adjusted to their liking, if not to that of their grumbling beasts who kept up a continual gurgling and grunting while their packs were being secured. One of the camels carried a special *albada* upon which the two ladies could ride, slung one on each side of the animal's hump. Bishop and I shared another beast sitting one on each side of the wooden frame of an empty carrier. (See illustration facing page 260.)

All this time the crowd stood round in a wide circle, and it was with no little relief that at 10.30, with much shouting and cries of "*Jutche camél!*" from the drivers, to the weirdest possible accompaniment from the camels themselves as they struggled to their feet, we streamed out of Puerto Cabras in the direction of Oliva.

For the first mile or two, the track lay parallel with the sea-shore, and at times led down to the water's edge, for this part of the coast is low and stony. Kentish Plovers and Turnstones by the rocky pools

attracted our attention, but otherwise the coast seemed deserted of bird-life. Beyond the beach lay a flat barren plain which stretched inland to a low fringe of equally bare hills. When I say the plain and the hills were bare, I mean they looked so from a distance, for the ground, though very parched and dry, bore a certain amount of scanty vegetation, in patches appearing almost purple from the bloom of the *Suaeda fruticosa*. I was surprised to see how hilly the country was inland, though of course the hills looked very insignificant after those of the Western Islands.

Though constantly on the look-out for birds, we were disappointed to find them remarkably scarce, and nothing appeared in sight but Short-toed Larks and a few Berthelot's Pipits, both old friends from Gran Canaria.

As we began to leave the coast, this state of affairs improved a bit; two Kestrels belonging to a new form recently described as distinct from the Kestrel of the Western Group, were spied hovering over the plain; a Koenig's Shrike was procured, but a Black-bellied Sand-grouse, flying very high, passed overhead well out of gun-shot. We soon began to skirt a wide valley, where a certain amount of cultivation had taken place—a thin crop of wheat covered a large expanse of ground, but one could easily have walked between the blades of corn without trampling upon a single one. Passing across a patch of sandy ground where the stones were smaller, a flock of Cream-coloured Coursers were frightened and took to flight, uttering their musical call.

We were now rising slowly all the time; the wide *barranco*, still parallel with our track, lay on our right, and it was there that we saw and obtained our first Fuerteventuran Chat, one of the most interesting of



On the March.



Camels loaded up.

the island birds, of which more will be told later. There were only three Chats together, but they cheered our somewhat drooping spirits, especially when Bishop, who had dismounted, brought one back with him.

This part of the ride was not particularly interesting, apart from the novelty of riding over new ground, for with the thermometer standing at 79° Fahr. in the shade, riding in the glare of the mid-day sun was very trying.

We decided to camp at a spot called Caldereta, and here we pitched our tents under the shelter of a lava-built wall. The number of Hoopoes in this neighbourhood greatly astonished us—in every direction they were to be seen. Trumpeter Bullfinches kept visiting the old stone well for their evening drink, clinging on to the rough perpendicular sides whilst they quenched their thirst. Their coral-red bills and soft pink plumage make them the most attractive of all desert Passerine birds, and I was delighted to find how tame they were, permitting a close inspection. Spanish Sparrows literally swarmed everywhere, filling the air with their noisy chatter as they fought and squabbled in the palm-trees near by. I was surprised to find them nesting in the same palm as a pair of Kestrels in perfect harmony, apparently.

Caldereta, lying at 350 feet above the sea, was anything but an attractive spot. Behind us rose barren, undulating hills, and it was without regret that we contemplated leaving on the morrow for happier hunting grounds.

We struck camp as soon as we had finished skinning our trophies, once more taking the road to Oliva—a town in the middle of the northern part of the island. Our destination was Toston, on the north-west coast, known for its fine reefs, and there I

hoped to meet with Meade-Waldo's Black Oystercatcher. The pack camels were heavily laden and we went along very slowly, the track skirting a low range of hills which stretched as far as we could see. As we neared Oliva, Coursers were again seen; Pipits were common and Short-toed Larks abounded. When cactus hedges began to make their appearance, Hartert's Brown Linnets became plentiful, the males, with brilliantly red breasts, balancing on the prickly grey-green leaves and adding a welcome note of colour to these ugly-looking plants.

Oliva is quite a small village, built in the middle of a wide plain, its principal building being, as is usual in these villages, a large bare-walled church. Big herds of goats wandered over the hill-sides, but otherwise the entire neighbourhood appeared deserted. The village lies about 1706 feet above the sea and has little attraction from any point of view. Immediately beyond the village the country was less barren, a good deal of cactus had been planted and every inch of ground capable of cultivation had been tilled and sown; even the bare hill-sides had been methodically terraced, and viewed from a distance produced rather a curious effect.

We soon left this cultivated area behind and passed between low, parched-looking hills, more terribly barren than any we had yet seen. The country was distinctly hilly in this neighbourhood, but our track wound in and out of the depressions and we had luckily very little climbing to do. The camels were deplorably slow, and as hour after hour we seemed to be passing through exactly the same type of country, we found the ride somewhat monotonous. Apart from the ever-present Short-toed Larks and a few Hoopoes, birds were conspicuous only by their absence. As

we neared Toston, the country became more sandy, and a few Coursers again appeared. We passed over several dry water-courses, which were mere dry cracks in the earth, zig-zagging to a *barranco*—these water-worn “nullahs,” though some twenty feet in width, with absolutely perpendicular sides, as if cut out with a spade, were about nine feet in depth. They were remarkably difficult to detect until one had almost stumbled into them, and would prove exceedingly dangerous obstacles when walking or riding at night. I did not come across any similar water-courses anywhere else during my circuitous journey in this island, and much regret that as we were hurrying to reach Toston before nightfall, I did not stop to examine their formation more closely. The last part of our ride lay over rising ground between undulating hills, and as we gained the top of the last incline, we looked out upon a wide plain stretching to the sea.

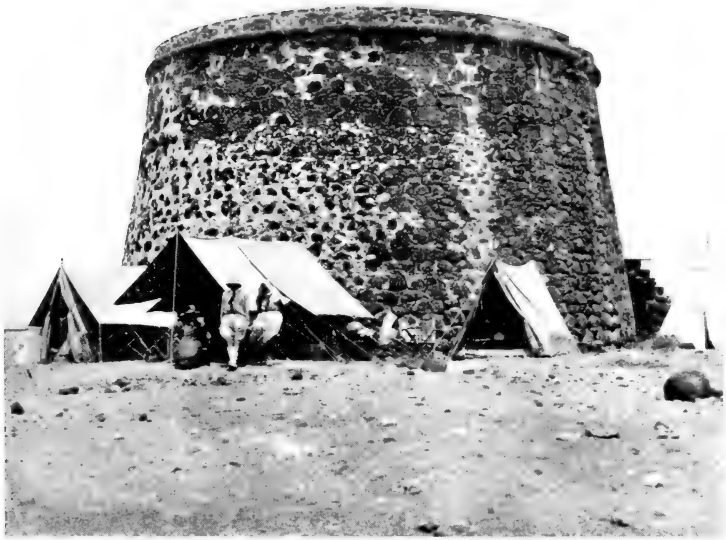
Toston, which is only a small collection of houses, lay a little to our right, built on the edge of the cliffs in a depression in the coast-line. A little to the east and about a mile from the sea another collection of houses was visible, but this settlement we left well on our right, as I intended to camp at the first suitable spot to the south of Toston village.

A curious round tower (see accompanying illustration), looking exactly like the Martello towers found along the Kentish and Sussex coasts, caught our eye at once, and as it was perched on the very edge of the cliff about a quarter of a mile from the village, we decided to pitch our tents close to its round walls. It was now almost dusk and we had a terrible scramble to get the tents up before dark, pitching the last by the light of our lanterns. Juan and José, rather than trouble to put up their tent, at first chose to sleep in the tower, but they had not

been there long before they came flying out in great haste, rats having run all over them as soon as they lay down in their blankets.

Looking out of the tent next morning, we found we had camped in an ideal position. From the tent door we could throw a stone over the edge of the cliff into the sea, which came thundering against the rocks beneath with a mighty roar. A glorious day greeted us—the views were simply splendid, and a long stretch of the coast-line to the south lay before us, the sea an indescribable colour and the air cool and bracing. What a change from the endless dust and glare of yesterday's march! To the north lay the village of Toston, opposite a small rocky island, and beyond the village the extensive lava reefs run out as far as the lighthouse, built some two miles to the north, on the extreme north-western point of Fuerteventura. The morning was spent in skinning and labelling our birds, filling in the outline map of the island and writing up diaries. The reefs were certainly splendid for rock-loving Waders—streams of black lava which had flowed far into the sea at many points running out horizontally to the shore. In the distance, the volcanoes of Lanzarote, separated from Fuerteventura only by a narrow strait, stood out clearly against the sky, permanent monuments to the terrible eruptions which in past years have torn this unfortunate island. (See illustration facing page 268.)

We worked these reefs carefully for three days, but saw no sign of the bird we were especially searching for. Certain Waders were common enough, particularly Kentish Plovers and Turnstones, the latter in the most beautiful full breeding plumage. A few Common Sandpipers and Whimbrels searched the pools which the receding tide had left, and I believe I saw one Curlew and a Godwit. Two Grey Plovers, males, in their



Camp by the Old Tower of Toston.



Toston and the Coast to the North.

handsome breeding plumage, were seen one day on the reefs, but were very shy. A single Dunlin was also noticed. All these birds, with the exception of the first named, are birds of passage in the Canary Islands, resting here a short while on their long journey from their winter quarters in Africa and Australia, to their breeding quarters in the North.

Along the foreshore, the lava blocks were larger and lay further apart, while beyond a stretch of firm sand, a belt of sand-dunes was covered sparingly, but more or less regularly, with four plants. Unfortunately, most of my botanical specimens from this island came to grief, but on much the same type of ground in another place the four prevailing plants were *Zygophyllum fontanesii*, *Salicornia fruticosa*, *Suaeda fruticosa*, and *Atriplex Halimus*.

Passing over the belt of sand-dunes, where Kentish Plover were breeding in numbers, we came out upon a wide plain where Short-toed Larks and Berthelot's Pipits were at once seen. The plain was covered with small loose stones, and here and there such plants as *Ononis ramosissima*, *Launæa spinosa*, and *Euphorbia Paralias* redeemed it from utter barrenness. Across the plain we could see the low range of hills over which we had ridden the previous evening, absolutely bare in their and entire extent curiously rounded and undulating.

Riding one day to the lighthouse, our path again took us across the sand-dunes, which were as singularly devoid of bird-life as on our first visit. A few camels turned out to feed gave the scene a Saharan touch, and as they moved leisurely away from us, I secured rather a pleasing photograph of the unwieldy beasts. Pipits, Larks, and Kentish Plover were the only birds noticed on this ground. The lighthouse is a nice clean building, rather low,

and built on the point which here juts out to sea. It was in the charge of a charming old Spaniard, who was most polite and kind, taking us into his best bedroom and offering us Spanish beer and other refreshments. He told me that he had been lighthouse-keeper in Lobos and Allegranza, and I got a good deal of information from him on the subject of the birds he had met with. The Black Oystercatcher he knew well, and said he had often seen it in Allegranza, and occasionally in Lobos, but although he had been six years in his present station he had never seen the "*Graja*" as it is here called, once on the reefs. Our return journey only added a Redshank and a Heron to our list of birds already seen.

The Toston villagers were much interested in our camp and every day came out to gaze at "the curious creatures which God had made," as they politely put it! By their demeanour they might have been savages from the Snow Mountains of Dutch New Guinea, looking upon "white men" for the first time in their lives, instead of Spanish Canarians engaged in the peaceful occupations of carting limestone and fishing. Examination of the bird-life of the plain behind the camp revealed only Larks, Pipits, Hoopoes, a few Koenig's Shrikes and Rock Pigeons. Coursers were very scarce, but many Pale Swifts were generally to be seen hawking overhead. While at this camp, the villagers of Toston one day brought in two hedgehogs, which we bought for twopence each, and which on our return to England proved to belong to a new and undescribed species. Not only were the hedgehogs new, but the fleas with which they were infested were also new to science.

The tower beneath the walls of which we had pitched our tents greatly aroused our curiosity, but we never succeeded in discovering when or by whom it

had been built. Obviously a watch-tower, commanding extensive views over the sea, it was very solidly constructed of huge blocks of stone well cemented together, and was round in shape with an inside stone stairway, leading up to two rooms now entirely given up to the rats. The idea occurred to us that it might have been built as recently as the Spanish-American War as a look-out station, but then one would naturally expect to find similar towers built at other points of the coast, and this was the only one of its kind we met with. That it was built for the purpose of defence seems more probable, judging from the thickness of the walls.

Having completed our survey of this district we determined to sail down the coast for $21\frac{1}{2}$ miles and land at Punta de la Peña, from which place we could send inland for camels and thus gain the central plains in the shortest possible time. For this purpose we hired the two largest fishing-boats we could find in Toston, and arranged (weather permitting) to leave the little village on the 10th of May. We had already acquired a fair collection of birds and plants, and worked far into the night packing our trophies into the collecting-boxes and preparing for an early start.

We were up before sunrise next morning, and soon the tents were down and rolled into their big canvas bags. The surf was too heavy to allow of our loading the boats at the usual place, so we had to go out to a much more dangerous-looking reef, from which we eventually embarked. Of our feelings during the four and a half miserable hours we spent in these boats, the less said the better. I had intended to keep a sharp look-out for Petrels, Shearwaters, and other sea-birds which one might reasonably expect to meet with on a journey of this kind, but these good intentions had to be abandoned, although for the first half-hour my

interest in the coast was certainly stronger than any other feeling.

We soon lost sight of the plain, which for a mile or two separated the cliffs from the range of hills farther inland, but as we sped along under full sail, we noticed that the coast-line became more "mountainous"—the hills shelving precipitously to the sea. I regret to say that long before we had got half-way to La Peña, my head sank affectionately on to the back of an enormous crab, which kept perfectly still, so that I only learnt of its presence as we neared our journey's end!

Although the wind had dropped an hour previously, and as a result our pace had considerably slackened, the sea was still much higher on this part of the coast than we had expected, and our boatmen shouted to their comrades in the other boat that they dared not land us in the sandy bay which lay on the further side of La Peña Point. We caught the breeze squarely as we rounded a rocky headland and the boats fairly plunged through the waves into a good-sized bay surrounded with cliffs, which were literally honeycombed with caves. The curious formation of these cliffs led one to think that elevation of the land had taken place, and what appeared to be an old shore-line was clearly discernible (see accompanying illustration). How we were to be landed on this forbidding coast I hardly dared to imagine. The heavy swell rolling into the bay tossed our frail craft about like shells, and as the waves roared into the caves or came thundering against the cliffs, clouds of spray were sent fifty feet into the air. There appeared to be no place on the face of the cliff better than another at which a landing could be accomplished, but our sturdy Canarian sailors managed their craft with extraordinary skill, and deftly ran the boat alongside a shelving ledge. The rise and fall of



The Lava Reefs at Toston.



The Landing-place, La Peña, Fuerteventura.

the swell at this point seemed to be accentuated with our proximity to the cliff; now the boat was poised on the crest of a wave and we rose far above our former level, only to fall again as the swell rolled onward into the bay. As we again rose, one of the boatmen leapt at the ledge, choosing the exact moment when the boat seemed to be neither rising nor falling, and a moment afterwards he was left clinging to the precipitous rocks far above us. As the next wave heaved us up, a second sailor sprang for the cliff, and, one by one, my wife, her sister, and the rest of us, made our leap for the land, being caught by the two sailors on shore and hauled by our wrists up the side of the cliff to a place of comparative safety. It was certainly the most exciting landing I had ever made, and even when left to our own devices, we had to crawl like cats on all-fours from ledge to ledge, bumping our heads on the oft-overhanging rocks. The sailors were most picturesquely dressed in brightly coloured garments, light blue trousers rolled high up their brown muscular legs, and vivid yellow or red scarfs wound round their waists. Their coloured shirts, showing skin tanned almost to the colour of mahogany, were open to the waist, and as they sprang like goats from rock to rock they reminded one of the smugglers of whom one used to dream in one's youth.

Although we had all landed safely ourselves, we had still to get our baggage ashore, and this could not possibly be accomplished in this cove. There was nothing to be done but for the boats to round the headland into the next bay, where the landing would naturally be made in calm weather, and where the beach is sandy and shelving. We were dismayed to find that an even heavier sea was running in here. The boatmen had all their work cut out to keep the

boats from grounding, when they would have been swamped at once. One by one the men jumped into the sea, well over their waists, and with the packages on their broad shoulders, stumbled ashore through the surf. The first boat, containing my collecting-boxes and food, was safely unloaded in this way, and the second boat had just taken its place, when we were startled by a cry from Juan, and running to the point, saw to our horror that it had capsized and all our tents were in the sea. Luckily everything was saved, little the worse for the ducking, and we quickly turned our attention to finding a camping ground for the night.

The Barranco de la Peña runs inland at right angles to the coast and is thickly lined with tamarisk bushes. About a mile from the shore, a square white house, belonging to Don Pedro Manrique, is well placed in a grove of date-palms, and here we were invited by the major-domo to pitch our tents. No one could have shown us more kindness, and a camel was at once despatched to the shore to bring up our half-soaked belongings. It was already dark when the beast had completed its fourth and last journey, and after such an adventurous day we were glad to turn in as soon as the last tent had been pitched by the light of the moon.

We awoke, to the cooing of Turtle Doves, to find ourselves in a most delightful camp. We had pitched the tents on an elevated piece of ground, in a grove of really fine palm-trees close to the Spanish homestead. Beyond the plateau, migratory Swallows were hawking over a patch of maize, as they do in our corn-fields at home. A stream of water close at hand had been diverted into a fast-running *acequia*, and everything looked green and flourishing. Orange-trees



La Peña Camp.



The Home of the Fuerteventuran Chat.

and banana groves had transformed the valley into a delightful oasis. On either side of the plantation the bare slopes of the *barranco* led on to the parched plain, where not a tree was in sight, nor a square yard of shade to be obtained. Bishop, who had been out reconnoitring, returned with the news that the valley was full of birds belonging to species we had not yet come across. In proof of this, he brought with him specimens of the Fuerteventuran Blue Tit, Sardinian Warbler, and a curious light coloured Hoopoe, and we immediately decided to stay in this camp for three or four days. Our first day's work proved that the Barranco de la Peña was a regular El Dorado of bird-life. The tamarisk scrub grew very thickly and it was very hard to get through. The most noticeable bird was the Sardinian Warbler; the hens were in greater numbers and also easier to shoot than the cocks. Pale Fuerteventuran Titmice were fairly common and not at all shy. A pair of Kœnig's Shrikes was seen—the male as usual on the topmost twig of a bush. Least Goldfinches and Hartert's Brown Linnets were both numerous, while Berthelot's Pipits, a few Short-toed Larks and Spanish Sparrows were also noted, the latter nesting in dozens in every palm. A fine pair of Kestrels was feeding its young in a palm in which many Sparrows had their nests; this seems to be quite a common occurrence in these islands, the Sparrows and Kestrels living in perfect harmony. Turtle Doves—summer migrants to the Canaries—were heard on all sides, and we found a nest containing two eggs belonging to this species. Best of all, the *barranco* was literally teeming with Meade-Waldo's Chats—these delightful little birds giving us many opportunities of observing their habits. Unfortunately they had all bred, and the young were by this time

hopping about with their parents. The three following days were spent in making a complete collection from this productive neighbourhood, and in chasing the many butterflies which haunted the valley.

As evening approached, Brehm's Pale Swifts were very much in evidence, screaming in unison as they flew between the trunks of the palms; their white chins were plainly visible as they twisted and turned in the sunlight. We did not see any Black Swifts—they seem to prefer the high ground. We soon obtained all the birds we required, including a fair series of eggs, and regretfully decided that we had no further excuse for remaining in this delightful spot. Every evening after "dinner" we sat outside the tents, often with our small collecting guns, on the look-out for bats. It was beautifully warm and the nights were gorgeous—the moon shining through the palm-trees made everything as clear as day, and in the distance the roar of the sea could be faintly heard.

This was far the most agreeable camping ground we struck throughout the entire trip, and it took much effort to tear ourselves away from our palm grove and set our faces towards the shadeless plains once more. We made an early start from the palm camp on the 14th of May. I intended to cross the high ground in the middle of the island and gain the plains on the east of the central hills, which form a kind of backbone to the island. We had no special objective, once we had gained the plains, but *en route* I wished to pass through Santa Maria de Betancuria, the ancient capital of Fuerteventura, which lay buried in the hills on our direct route to the plains. The village of La Peña, which gives its name to the *barranco*, lies at about 900 feet above sea-level, and from here we had managed to secure camels. As we gained



Santa Maria de Betancuria.



The Ancient Capital of Fuerteventura.

the higher ground the country took on a much greener aspect, cultivation again appeared, and Shrikes were noted for the first time since leaving the camp. A few flocks of Trumpeter Bullfinches were also seen here. As we ascended, many roosting places of Egyptian Vultures were noticed, but other birds, including Ravens, were scarce. A Canarian Buzzard was seen, however—a rare bird in Fuerteventura.

The camels found the stiff climb very difficult, but kept moving rapidly; they were much finer animals than we had obtained at Puerto Cabras, larger and in better condition. An arduous climb brought us out on to a plateau lying at 1350 feet sown with wheat, where we again found the Short-toed Larks in numbers. Having crossed this flat tableland, the descent to Betancuria began. This tiny, old-world Spanish village, lying hidden in the mountains at 1150 feet, is a place of great historical interest, which takes its name from Jean de Bethencourt, the French explorer, who, with Gadifer de la Salle, conquered the island in 1542. An ancient and picturesque house which still stands in the village is pointed out as Bethencourt's, and there is also an old monastery here which can be seen in the lower illustration facing page 272.

We lunched in Betancuria and rested the camels. On leaving the village, our way led upwards again among undulating hills of varying heights which stretched in all directions, but at last we reached the summit, 1900 feet, the highest ground which we had to cross in the island. On both sides of the ridge, to the east and to the west, the sea was visible, and before us stretched a very large plain, or rather two plains, which were separated by low, undulating hills. Antigua village lay almost at our feet, and away to the south we could see Casillas de Morales, another village

in the middle of the northernmost plain. A range of low hills bounded the plain on the south-east and divided it from the flat country beyond, where lay the villages of Tuineje and La Florida. As we turned our eyes to the north, we could see yet another wide plain spread out like some great blanket, with low barren hills in the distance, sheltering Puerto Cabras beyond. Everything looked bare and desolate from this height, except in the neighbourhood of the straggling white villages and outlying farms, where fig-trees and palms stood out above the fields of grain.

It was difficult to realise that we were still in the Canary Islands, used as we all were to the vine-covered hills of Gran Canaria. As we rested at the summit of the pass with this panorama before us, I made up my mind to camp near the village of Antigua, for it was absolutely necessary to be near water if possible, and for that matter one part of the plain looked much like another. Slowly we wended our way down the rough track which wound round the hill-side, and then crossing the plain, passed through Antigua and camped on the farther side. The field in which we pitched our tents will not easily be forgotten by us, for its soil was a horrible finely powdered red earth, and long before the tents were up everything was covered with the red dust. Pale Swifts were hawking overhead, and Hoopoes seemed more plentiful than ever. Behind our camp the open plain stretched for miles, and here Coursers came in the evening. Almost before it was light next morning, the Hoopoes began calling "Ta-bo-bo—Ta-bo-bo—Ta-bo-bo-bo!" a call which will ever bring before my eyes the vision of a burning plain, with poor-looking white houses dotted upon its surface, in whose doorways naked children stood gazing in rapt attention at the three green tents—a vision of red



Baggage Camels resting in Betancuria.



Camel drawing Water from a Well.

earth and of a villainous-looking, black-bearded Spaniard, who sat on a tiny donkey, waiting to escort me to the haunts of the most interesting bird to be found in the island—the splendid Fuerteventuran Bustard. With this intent, we made a wide sweep over the plain in the direction of Casillas de Morales. Suddenly, to my joy, a great bird got up, and with a motion almost like that of a Heron flew leisurely over the desert, pitching about 500 yards off. The donkeys scrambled quickly over the stony ground, which was here plentifully sprinkled with small *ajulaja* bushes, but the bird kept the distance between us, running swiftly over the uneven ground. Suddenly it disappeared as if by magic and I hoped it was squatting, but search as we would we never saw it again. The plain was here as flat as a billiard table and covered with large dark stones and numerous desert plants, such as *Launæa spinosa*. I noted upon the prickly *ajulaja* plants numerous small snails to which the Bustard is said to be partial. Trumpeter Bullfinches, Short-toed Larks, and Hoopoes were the only birds seen on this ride, to my great disappointment. Even Coursers and Sand-grouse were absent.

Round the camp, Pipits were also very plentiful, but of all the birds I think the beautiful Trumpeter Bullfinches were perhaps the commonest. We watched for some time one of Meade-Waldo's Chats close to the camp—a very young bird which must have been bred in the neighbourhood. During our sojourn here we obtained numbers of eggs of Trumpeter Bullfinches, Larks, Norfolk Plovers, Linnets, and Sand-grouse. The nest of a Sand-grouse from which a child had brought in the eggs and which I went to examine, consisted of a few bits of dried grass scratched together in a depression of the ground and placed in a small circle

of stones. The birds were still near the nest, but were very wild, and I failed to obtain them. We found that the Coursers frequented the ground to the north of the camp, where the stones were smaller and the earth more sandy. I saw another Bustard in this part of the plain close to our tents, and watched it for some time through powerful Zeiss glasses. I am afraid from all accounts that this magnificent bird is not nearly so plentiful nowadays as it was in 1890, when Meade-Waldo collected in the island. It will be a thousand pities if it becomes extinct, as it is amongst the most interesting examples of adaptation to physical environment. The evolution of this Bustard has been alluded to at some length in an earlier chapter. Unfortunately, the bird is considered a great prize by local sportsmen, and has been the victim of the abominable habit which these gentlemen have of trapping the bird on the nest. Its eggs are sought for by every small boy in the island.

It was without much regret that we finally left Antigua in a mule-drawn *tartana* for Puerto Cabras. The road—the first we had struck in Fuerteventura, led through Cuyenta and Casillas del Angel, across two large plains separated from one another by a stretch of undulating country, having the same burnt-up appearance and containing hardly any bird-life save the ever-present Hoopoes, Larks, and a few Shrikes. Our reduced caravan made fast progress, and in under three hours we arrived on the plateau above the little port from which we had commenced our tour of the island. Our tents were pitched in a field belonging to a farm close at hand; a few fig-trees and palms afforded but little shelter, but we enjoyed the great advantage of having running water in an *açequía* near by, and the pleasure of overlooking the sea once more.

We spent the remainder of that day in repacking our specimens, my wife and sister-in-law leaving us here and returning to Gran Canaria, taking the Fuerteventuran collections back with them to Las Palmas. We had obtained a thoroughly representative collection of the birds of the island—123 skins in all, besides the bats and hedgehogs, 100 eggs and a few typical Lepidoptera, a number of plants and a few geological specimens representative of the localities in which our camps were made. The *Viera y Clavijo* (1000 tons) sailed at one o'clock on the following day; the sea was calm and the weather glorious and a good voyage was made.

Bishop and I had to wait thirty-six hours before our boat sailed for Lanzarote, so we had time to examine the coast-line. For this purpose we followed the shore to the south of Puerto Cabras, on the look-out for Waders. These were scarce, only Kentish Plover and one flock of Turnstones, some adults in beautiful breeding plumage, being noted. It was very late in the year to find these Turnstones about, they certainly do not nest in the islands and must have been non-breeding birds. The only Gull shot was a Yellow-legged Herring-gull—the common species of the Islands. About a mile and a half down the coast we came to the sandstone cliffs which Meade-Waldo described twenty-three years before our visit, when he found the Pale Swifts breeding there. A few Swifts were about, but they were not nesting there then. The cliffs were full of small holes, the tunnels appearing to slant upwards, and all were very even as if made by the action of water. The sandstone seems to be worked here, which might account for the birds deserting their old breeding quarters. Beyond the cliff a sandy cove separates it from the rocky shore,

the firm sand giving place to sand-dunes thickly covered with a curious fleshy-leaved plant.

We struck inland at this point, making for the camp over the plain, now a sheet of purple from the bloom of the *Suaeda fruticosa*. The prickly *Launcea spinosa* was common everywhere. Inland, the country was hilly, bare rounded hills difficult to describe, with never a tree to soften their barren aspect. Occasionally the landscape was relieved by a solitary white farmhouse on the plain, surrounded by fig-trees, and maybe a solitary date-palm. At this time of year the desert looked almost beautiful, but this was entirely due to the purple plant. Light stones and the darker pieces of basaltic lava formed a background, upon which the Hoopoes were as invisible as the Bustard. Truly it is a country which one requires to know intimately before its real fascination becomes apparent. Sand-grouse were often seen; they have a musical liquid call, very pleasant to the ear. Coursers and Trumpeter Bullfinches, the Short-toed Larks and Berthelot's Pipits had these plains to themselves. Near the farms, Hoopoes and Shrikes were always in evidence, while clouds of Spanish Sparrows rose from every patch of corn. As evening approached, Swifts filled the air—both species were now observed, the Pale and the Madeiran Black Swift. The former were in far greater numbers and flew at a lower elevation than the Black Swifts.

We had not yet obtained a series of Sand-grouse, so, early on the morning of the 18th of May we left camp at 6 A.M. to try our luck with these birds, so difficult to approach in the open. A few were moving about over the plain but were very shy. About a mile inland there is a place where these birds come to drink, and this spot we made for, an old Spaniard who knew their habits intimately acting as guide and

ghillie. Having arrived within shot of the drinking place, the old farmer built a circular "butt" of large stones round me, leaving three loop-holes through which the muzzle of the gun could be pushed. Two and a half hours were spent there crouched in the "butt," and I have seldom enjoyed anything better. The Black-bellied Sand-grouse, or "*Gangas*" as they are called in Fuerteventura, are very shy, being continually shot at, and as they notice the slightest movement, it is necessary to keep absolutely motionless. The birds began flying at 7 A.M., but most of them are late drinkers, and I found that they came chiefly between 9 and 9.30 A.M., while many did not put in an appearance until 9.45, when the sun was mounting high in the heavens. I was already getting very stiff in my cramped position, when the Sand-grouse started to come in. They flew very fast, uttering their pretty liquid call, which sounds like bubbling water, and after circling round once or twice, settled about forty yards from the *açequia*, which ran here flush with the ground. Carefully the birds, a small flock of five, looked round to see if they were being observed, squatting flat to the ground meanwhile; satisfied that all was safe, they began to approach the water in a series of short runs, the head close to the ground, every now and again stopping to glance from side to side to make sure that no danger threatened. When the water was reached they drank greedily, and it is now that the native sportsman chooses to fire, bagging sometimes four at a shot. To the annoyance of my old guide I had substituted field-glasses for my gun and did not fire at this first flock, but his annoyance then was mild to his wrath when I lifted my gun to my shoulder and fired at two birds as they circled round preparatory to settling. The fact that I should fire at them while still on the wing clearly

showed that I was mad and quite unworthy of the care which he had lavished on my circular "butt!" After this, I had quite a number of shots; sometimes the birds were in flocks of six or seven, but more often they arrived in pairs.

Returning to camp we spent an easy day, completing maps and diaries. At 11 A.M. the little steamer which was to take us to Lanzarote hove in sight. We sent all our baggage, save our tent, on board early, finally taking that down by the light of the moon after dinner. We were not timed to sail until past midnight. It was the most exquisite night, warm and still; the wind had entirely dropped and the sea lay like a sheet of glass with never a ripple upon it. When we went on board it was almost as light as day, and even Puerto Cabras looked picturesque in the moonlight. At 1.30 A.M. I woke to the noise of the anchor-chain being slowly dragged up, and a few minutes later the throb of the engines told that the *Gomera-Hierro* was under way.

CHAPTER XIII

AN ORNITHOLOGICAL EXPEDITION TO THE EASTERN CANARY ISLANDS (*continued*)—LANZAROTE

AT 5 A.M. on the 19th of May, we dropped anchor off the insignificant port of Tiñosa, and half an hour afterwards went ashore with all our baggage in the cargo boat. The view we obtained of the coast was not unpleasant. It was more rocky than most of the Fuerteventuran shores, and struck me as looking peculiarly dark in colouring, being composed of black basaltic lava. Rocky headlands jutted out to sea, giving the coast-line a very rugged aspect. Inland, the island seemed to be much more mountainous than Fuerteventura, and with an even more burnt-up appearance. In fact, the wholly volcanic origin of Lanzarote strikes one immediately upon landing on its shores. (See illustration facing page 282.)

The scene on the beach was even more animated than at Puerto Cabras. I do not think I have ever seen so many people jammed into so small a space. These were not idle sightseers, but were all busily engaged in packing onions! Both men and women were at work—the men in every variety of costume, the women all wearing big straw hats. Camels laden with onions lay about on the beach, which was covered with crates, and these the women were packing and the men nailing up. Onions were even bobbing about in the waves, as if there had been a terrible shipwreck.

Everywhere an indescribable noise arose, men shouting, women singing, children yelling, and on all sides constant hammering as the crates were closed down. They were then carried into a large shed built on the beach to await shipment. The agent in charge of the store was most obliging, putting his private office at my disposal, while Juan bargained with the owners of the camels to take our belongings and selves across the island.

For five and a half solid hours did we haggle over the price of the camels! The men stood out for a ridiculous price, knowing well that we were in their power. At length we got the store manager to tell them we intended to leave our baggage for the next boat, and set out on our own feet, and this ruse, though far from true, at last brought them to their senses. During these parleyings, I had been exploring the neighbourhood and had shot one of a pair of House Martins, which were evidently on migration. The Yellow-legged Herring-gulls were wonderfully tame and looked very elegant perched on the black rocks in the brilliant sunlight. Pale Swifts were also seen. Before leaving the coast I took a photograph of the onion packers; the excitement when I announced my intention was enormous, only equalled by the indescribable confusion. When all was beautifully arranged and the packers had grouped themselves to their liking, a camel with its owner on its back slowly stalked into the centre of the picture, thoroughly upsetting their arrangement! Considering the difficulties under which the picture was taken, the result was tolerable.

My plan was to ride these camels as far as Yaiza, where I knew I could obtain remounts without much trouble. We at last left Tiñosa at 11 A.M. with three pack beasts and a camel for ourselves. As soon as we



The Bay of Tiñosa, South-east Coast of Lanzarote.



The Village of Uga.

left the coast we began to climb, passing between walls of lava blocks, which were also used as boundaries to the "fields." The ground seemed to consist entirely of smashed-up lava, and the fields were planted with maize and cactus. We passed several poor-looking houses and continued to ascend to the *carretera*—a really good carriage road, which we followed towards the south of the island. The mountains which we were approaching in a westerly direction are a large chain of craters running north-east by south-west, and we passed through a depression of this range near its western extremity. Just as we were approaching the craters, I saw a Hawk flash past with long-pointed wings; though failing to recognise it at the time, I later discovered that it was an example of the Eleonore Falcon, a summer visitor to the Eastern Islands. The road led by a huge moon-shaped crater, the broken side of which was exposed to our view. Having passed through this chain of extinct volcanoes we came, on the other side of the range, upon the most fertile country I had seen in either Fuerteventura or Lanzarote. In all directions were fields of maize and wheat, vineyards, figs and palm-trees: the dwelling-houses unquestionably possessed a more prosperous air, and although here as elsewhere the ground seemed to consist entirely of cinders and powdered lava, the results obtained from cultivation were evidently satisfactory. Birds at once became more plentiful, and as we neared the village of Uga, behind which a group of large craters lay in a cluster, including the locally famous *Montaña del Fuego*, we recognised quite a number of species, of which more anon.

My attention was at once arrested by the marvellous lava-flow stretching to the sea. The flow must be surely over a mile in width, a truly wonderful sight—huge blocks of black lava piled one upon another. The

lava, sharp as a knife, ripped the leather off one's boots and cut the flesh if one was unlucky enough to trip up and fall. There was not a vestige of plant life, moss, or desert shrub to vary the monotony; even the plants which commonly grow on the Telde lava-flow in Gran Canaria, such as *Plocama pendula* and the miniature Dragon-tree, *Kleinia neriifolia*, were absent. I realised now the terrible destruction which the eruption of 1824 wrought upon this island; a veritable torrent of molten lava must have poured over the land, sweeping everything before it. Leaving the desolate lava-flow on our right, we passed through Uga without a halt, as I was anxious to reach Yaiza as soon as possible. The surrounding country was still highly cultivated, and the same birds were in evidence as we had seen before reaching Uga—Spanish Sparrows, Brown Linnets, Trumpeter Bullfinches, Berthelot's Pipits, Short-toed Larks, Kestrels, and Egyptian Vultures, while Pale Swifts were hawking overhead.

At Yaiza we changed baggage camels, going ourselves now on foot. Our destination was the Lago Januvio—a salt lake close to the sea-shore on the south-west coast. Every mile we advanced, the country seemed to become more and more desolate; the immense lava-stream lay on our right, while on our left, bare undulating hills rose one beyond the other, as far as the eye could see. An occasional thin patch of corn, carefully guarded by walls of lava, here and there struggled for existence; a pair of Coursers, Larks, Pipits, and two or three Kestrels, had this waste to themselves. At length the path which here lay between high lava-walls led out on to a flat tableland, and on crossing this we looked down fifty feet below upon the Lago—a small expanse of water, perhaps a mile in diameter, cut off from the sea by a beach of ground-up



Cultivation between Uga and Yaiza.



The Lava-flow between Yaiza and the Sea.

lava, piled into a narrow ridge by the pounding of the surf. The lake lies in a perfectly flat basin, surrounded on three sides by a low elevated plateau, and on the north by the big lava-stream, which here flows into the sea. I decided to camp on the same level as the lake, where we were slightly sheltered from the high wind which blew all the time we were there. Three days were spent here, and the longer we stayed the less we liked our gloomy surroundings; the wind rose to a gale, and as it howled round the tents we often longed for the pleasanter camps we had left behind. Even the bird-life was disappointing, the only species of real interest noted being the Black-necked Grebe, a flock of which came on to the Lago to shelter from the gale, the first record of these birds from the Canaries. A large flock of immature Turnstones, many Kentish Plovers, and one or two Dunlins were the only Waders met with, and the land birds were equally disappointing in variety, nothing new being seen. At each end of the lake the local fishermen had built salt-pans, where I hoped to find Wading birds, but apart from those already mentioned none were seen.

The lake shelves steeply towards the shore nearest the sea, with which it does not communicate, unless subterraneanly; the drying crust, as the water evaporates at the edge of the lake, gives off a very foul smell, which nearly succeeded in driving us away from the locality. Having had enough of the lake, we spent the 21st of May in the neighbourhood of Uga, capturing butterflies, pretty fatiguing work on crumbling lava soil in a scorching sun. We obtained here the Painted Lady, Red Admiral, Bath White, Little Blue, and the Clouded Yellow. These were chiefly found in the fields of beans, locally called *garavañças*, or amongst the tomatoes. Birds were plentiful, Kestrels, Pipits,

Bullfinches, Sparrows, and Linnets, and on the way back to the Lago, we saw Ravens, Vultures, and Thick-knees.

We determined to leave "Desolation Camp," as we had christened it, so the following day we left early for San Miguel de Teguisse. We followed the same road we had come by, as far as the bridle-path, which runs down to Tiñosa, thence over miles of partially cultivated plains and barren hills, the road gradually ascending to 700 feet, when the village of Tias is reached, from which point we got our first view of Arrecife. From this elevation we descended quickly to a broad plain, swept by a strong wind, where the only birds seen were Pipits and Hoopoes and a few Kestrels. We procured two Collared Pratincoles, however, occasional visitors to the Archipelago, and the first I had ever met with. The ride from Arrecife to San Miguel de Teguisse needs no description; we arrived very weary in the town after dark, to find we could get no lodging, and as our grumbling camel-drivers thereupon dumped our baggage down in the middle of the street, there was no help for it but to pitch our tent in the centre of the main thoroughfare, to the great astonishment of the good folk of Teguisse the following morning. Learning that our action might not be looked upon with much favour, we breakfasted early, and were on the road again before the "municipal authorities" had struggled from their beds.

Our ride from San Miguel to Haria was one of the most interesting I had yet had; the road winds over the hill behind the town, rising through well-cultivated ground, leaving on the right the old castle of Santa Barbara perched on the very summit of the hill. Higher and higher we mounted, the camels swinging slowly along, until at last we came out upon

a plateau 1900 feet above sea-level, which was shrouded in a mantle of thick driving mist, striking damp and chill after the hot sun, which had shortly before baked us through and through. The corn crop here was as thick as in the Western Islands, and everything was green and well watered. It was on this plateau that I first saw the Corn Bunting.

From this height we occasionally caught glimpses through the mist of the north-east coast of the island, and if only the weather had been clear, a fine view would have been obtained. Having crossed the plateau, where absolute silence reigned, broken only by the hoarse croak of a Raven, the *carretera* wound in great curves down the mountain-side to the valley of Haria, the town of which name we were fast approaching. The valley is as unlike the rest of the island as can possibly be imagined; instead of burnt-up plants and rugged crater walls, we beheld every kind of vegetation; the country looked green instead of brown, and shrubs of all kinds took the place of the stunted Euphorbias in the south of the island. Poverty lay on one side of the mountainous mass we had just crossed, prosperity on the other; the houses were better built, the Harians better clad, and birds were as plentiful here as they were scarce on the plains. We chose an elevated terrace on some private land, overlooking and about half a mile outside the town, upon which to pitch our tents. Fig, mulberry, and palm trees grew in profusion round about, while immediately below our terrace a big field of cactus kept would-be intruders successfully at bay. Immediately behind rose the Montaña Famara (2198 feet), down whose slopes the heavy mists were fast sweeping, until finally we too were enveloped and perforce turned in for the night.

The joy of waking to find sunshine and calm, instead

of the incessant wind we had hitherto experienced, was great. The valley of Haria is a splendid place in which to remain for several days and quite the best spot for bird collecting. We met with the Spectacled Warbler and the Lanzarote Chiffchaff, as well as the Pale Titmouse, for the first time in the island, all fairly common and apparently confined to this fertile district. Other birds noted in numbers were Spanish Sparrows, Linnets, Hoopoes, Pipits, and Kestrels. Several Ravens and a pair of Buzzards were continually to be seen, and later we found Thick-knees breeding in a sheltered *barranco* leading out of the valley. While in this camp a continuous stream of men, women, and children arrived with every conceivable article which they thought I might be induced to purchase—scores of lizards, caterpillars, snails, hedgehogs, birds' eggs and young birds—amongst the latter being two young Turtle Doves, which a man had brought on his camel for a distance of about five miles! These I kept alive and they went the entire trip with me, though they were never shut up, for they travelled in an open basket, and when in camp hopped about the tent. Flies were a terrible source of annoyance in this camp, and unless every one was cleared out of the tent before four o'clock (when they became sleepy) they made the early dawn as hideous as they made the day. Luckily I had a verandah to my tent, and sitting beneath it, one could write and read in tolerable comfort, the insects preferring the interior of the tent.

One evening towards the latter part of our stay in the valley I took my gun and walked up the *barranco* where I had seen the Thick-knees, on the look-out for Eleonore Falcons, which I felt sure must be somewhere in the neighbourhood; after walking for about half an hour I suddenly found to my surprise that



Tents behind Prickly Pears, Haria.



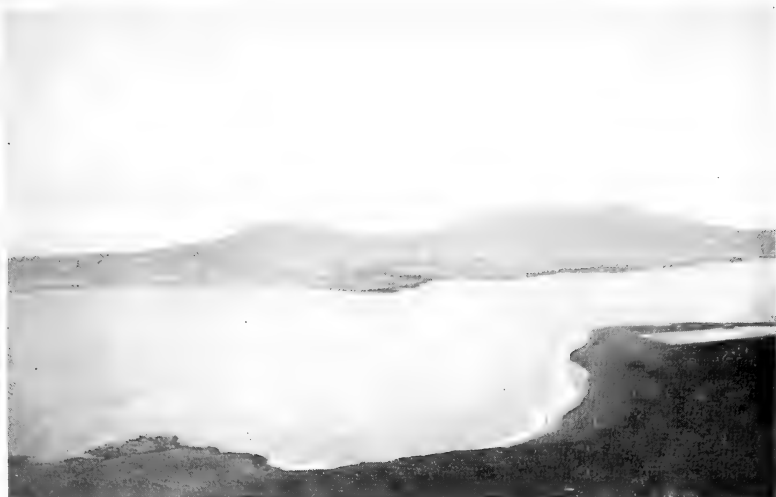
The Camp in the Valley of Haria.

I was standing on the edge of a precipice, falling sheer to the sea 1400 feet below. The most extensive view I had yet seen lay before me; facing south-west a great portion of the island was spread out far below. An astonishing view was obtained from this altitude, the flatness of this part of Lanzarote being accentuated by the often complete craters which dotted the surface. It looked exactly like a patch of sand upon which children had made a number of mounds with their buckets. The "Burning Mountain" and the chain of volcanoes near Yaiza and Uga, beyond which lay the Lago Januvio, could clearly be seen, though the lava-flow itself was hidden behind the volcanoes.

The view to the north was obscured by a ledge of rock. Mounting this, I found another surprise in the shape of all the outer islets, with the single exception of the Roque del Este. Upon these islets my hopes and thoughts had long been centred. Graciosa, the nearest of the four to Lanzarote, looked a flat, sandy island, upon which three extinct volcanoes rose up boldly; beyond was Montaña Clara, a single volcanic mountain, rising straight from the waves, with its tiny satellite, the Roque del Oeste, lying close to its northernmost point. Farther to the north again, Allegranza, the most alluring island of all, lay so far out to sea that only its barest features could be made out, but as all these small islands were visited in succession I shall describe them in their proper place. The precipice upon which I stood was singularly deserted of bird-life, but far down below me a party of Yellow-legged Herring-gulls was basking in the sun, on a ledge from which they glided, one by one, to rest upon the heaving surface of the sea beneath. A Raven croaking close overhead as it returned to roost, reminded

me that the sun was setting and that I had better quickly retrace my steps.

The night of the 27th of May was the roughest I ever experienced under canvas. Soon after dark the wind got up, and before long had increased to a tremendous gale, accompanied by a deluge of rain; many times during the night we thought the tents were coming down, but to our relief the long iron pegs held in the rocky ground, so our fears were not realised. It was unfortunate that we had arranged to leave for the outer islets the next morning, as the tents were soaked and difficult to roll, and although the rain had ceased, the sun had not succeeded in forcing its way through the heavy clouds. The baggage camels had to be sent round by a different way from that which we took ourselves, as no camels could descend the precipitous path down the face of El Risco. Juan accompanied the baggage, and we others rode slowly through the town of Haria. We ascended the path at the foot of Monte Corona, a wet, driving mist completely enveloping us, and at length came to the summit of El Risco, the high cliffs which bound the north-western coast of Lanzarote. From this point on a clear day an unrivalled view of the outer islets is obtained, but on this occasion we only now and then caught a glimpse through the fog of the island of Graciosa, upon which the sun was shining brightly, over 1500 feet below. Here we left our camels, and carrying our light baggage and guns, began the descent down the pass, a rough track covered with loose lumps of lava. Each one of us fell more than once, and we were lucky to reach the bottom without serious damage to our guns and selves. Having gained the beach, which was covered with exquisite small shells, we fell in with a Graciosan fisherman



El Rio, Graciosa, and Montaña Clara viewed from Summit of El Risco.



The Ancient Signal.

and his wife and family, who had apparently only just preceded us down the cliff. The women were then busy collecting dried plants and dead Euphorbia sticks with which they presently made a large bonfire (see accompanying illustration), the ancient signal used by these primitive people when a boat is required from Graciosa. As the smoke curled slowly upwards we saw a boat put out from the other island in speedy answer, and in less than half an hour it sailed into the little creek where we were eagerly awaiting its arrival.

CHAPTER XIV

AN ORNITHOLOGICAL EXPEDITION TO THE EASTERN CANARY ISLANDS (*continued*)—AMONGST THE SHEARWATERS OF GRACIOSA.

As our boat sped across the narrow strait which separates Lanzarote from Graciosa, we saw a line of single-storied stone hovels built close to the water's edge, on the south-west coast of the island. In front of these a number of small fishing-boats were hauled high and dry upon the beach, and here we landed. As the boat from Orsola containing our tents had not arrived, we accepted the invitation of one of the islanders to sleep in one of the huts, the owners of which we incorrectly surmised must be away. The Graciosans struck me at once as being of an entirely different stamp from the people on the main islands, superior in physique and in morals; we learnt to have the greatest respect for these hardy fisher-folk, many of whom were exceedingly handsome and well built. Their kindness to me while on their island could not have been exceeded, and in example of this I may say that they absolutely refused to accept any payment for the hospitality they extended to me on my arrival.

The hut in which we spent the night was a stone building containing three low rooms, one of which was filled with drying fish. The roof was made of brushwood, propped up with innumerable cross sticks, and the entire structure appeared as if it must tumble

down at any moment. As we were making our tea (we had luckily brought provisions for one night with us) the rightful owners of the hut streamed in—eleven men, women, and children! The majority at once sat on the floor, while the women busied themselves in making further preparations for our comfort, the entire assembly talking at once. As there was still no sign of Juan's boat rounding the Punta Fariones, and the sun was fast sinking, we began to wonder whether we were to share the hut with the eleven rightful owners, but to my intense relief they had evidently found accommodation elsewhere. The boat eventually arrived long after dark and was soon unloaded by many willing hands and our baggage carried up to the hut, which we gratefully occupied for the night. The ground upon which we decided to camp was about a mile from the cluster of houses where we had spent the night—the only habitations on the island. It had the advantage of being within easy distance of the only fresh water in Graciosa, and was conveniently situated for collecting birds. The tents were pitched on a stretch of clean sandy soil, covered with empty snail shells and backed by sand-hills. In front was the sea and on our left the strait, with the *risco* towering precipitously behind (see illustration facing page 294).

I spent the first two days in exploring our immediate surroundings and in recovering from a slight attack of fever, but we then got to work in real earnest. My first encounter with the large Canarian Shearwaters took place on the third evening after our arrival. Guided by a little Spanish boy, we made our way to a part of the coast where great massive pieces of basalt lay tumbled and jumbled one upon another (see accompanying illustration): the crevices between these boulders were just large enough for a thin man to squeeze into, and it was

into one of these that our little guide disappeared, signing to us to follow. Armed with electric torches, we scrambled through the narrow aperture, and after groping along an equally narrow tunnel and wriggling past jagged corners of rock, we found ourselves in a fairly large cavern, the roof of which sloped gently towards the farther end. Sweeping our torches round this cavern, we immediately discovered two large Shearwaters crouching beneath the shelving roof at the extreme end. They were far out of our reach, but we were soon to learn how the islanders procure these formidable birds. Leaving the two hens—for females they undoubtedly were—we emerged into daylight, having, as our little guide explained, come too early in the afternoon. We arranged to return later on, and 6 P.M. found us again in the same spot. The rocks were in places thickly covered with droppings, showing that the Canarian Shearwaters resorted in some numbers to this breeding-place. The fisher boy was now armed with a thin almond rod with a bent hook affixed to the end, and a lantern. At his bidding we all climbed down into a hole amongst the boulders and lay patiently waiting. It was just getting dark when a peculiar noise was heard unlike anything I had ever imagined in my worst dreams, and the form of a large bird passed close overhead; once again the bird circled round, uttering its extraordinary cry, this time being answered by a purring "cluck" (often repeated) from almost beneath our feet—then all was still. It was now quite dark, and once again the bird, which had evidently settled, rose again and passed over our heads, settling a few feet away. Stealthily as a cat, the boy climbed over the rocks, lighting the lantern as he went. He made no noise with his bare feet, and with the lantern in his left hand, and the almond



A Nesting-place of Kuhl's Canarian Shearwaters on Graciosa.



Camp on Graciosa, El Risco in background.

rod in his right, he stole up to the dazzled bird and struck with his rod but failed to get a hold, and the bird glided out to sea with a loud squawk!

Again we waited, and soon another bird came and alighted farther up the rocks, the lantern was relit, and the same stealthy crawl commenced; this time the rod came down true, and in a second the boy was holding a screaming bird up by the wing, but not before his hand had been torn in three places by the sharp bill. This performance was repeated several times, and once as we lay in our hole a bird passed within two feet of our heads; up flashed the almond rod, only just too late to bring the bird down upon our heads, a feat which I am told is often accomplished by these agile youngsters. It was between 7 and 8 P.M. when the first birds came in, and at 9 o'clock the birds' cries, which had up till now resounded from all sides, ceased as suddenly as they began, and once more all was quiet and still.

Before continuing an account of our adventures on Graciosa, a description of the island (upon which we eventually became prisoners for twelve days) may be given. Five and a half miles in length, and two and a half miles in breadth, this little islet has an area of nine and a half square miles. For the most part it is flat, with four extinct volcanoes upon it, the highest point—the wall of an imperfect crater—being 873 feet above sea-level. The soil is very sandy, and in parts the surface is thickly strewn with empty snail shells, a curious fact which I have already mentioned. The craters have a curious reddish appearance, from the fact that much of the lava and volcanic tuff is of this colour. The south of the island is covered with hummocks, capped with closely growing plants—*Zygo-phyllum fontanesii*, *Salicornia fruticosa*, *Suaeda fruticosa*,

Atriplex Halimus, and two species of *Traganum*, the roots of which are responsible for the curious formation of the ground, binding the sand as they do. It will be seen from the accompanying illustrations that the ground between the hummocks is perfectly flat, composed of hard sand, covered with snail shells. Between this "hummocky ground" and the sea, a wide belt of low sand-dunes fringes the shore. In almost the middle of the island rises the large central crater, Montaña de las Agujas, a mountainous mass rising abruptly from the stony plains, which stretch to the north and west. The coast-line for the most part is very rocky, particularly along the entire western strand, where the enormous basaltic boulders are in great contrast to the flat, water-worn reefs found on the south and east coasts. The western shore of Graciosa is exposed to terrific seas, as we were soon to learn, whereas the south and east coasts are sheltered from the violence of the waves. During the twelve days which we spent on this island, I made a fairly complete map, which is here reproduced; all four volcanoes were ascended and their heights ascertained by aneroid, besides which we walked completely round the island along the shore, as well as making many excursions to various points after birds.

The land birds of Graciosa were few in number and fewer still in species, but all were interesting. Spectacled Warblers were met with in small parties of four or five, flying about the plains, frequenting chiefly the rough ground, where they dodged in and out of the hummocks and were continually on the move. In the sand-dunes four pairs of Koenig's Grey Shrike were noted, and another pair lived in the Euphorbia scrub near the central crater. Berthelot's Pipits were numerous and were breeding. Six Kestrels were seen and young



Typical Ground Formation in the South of Graciosa.



Montaña Amarilla and Surrounding Country.

birds obtained in down, but we saw no sign of the Buzzards which had been reported as inhabiting one of the craters. Egyptian Vultures and Ospreys were both seen, however.

Other land birds noted singly or on one occasion only, were the Raven, Trumpeter Bullfinch, Hoopoe and Linnet. Close to our camp we found the eggs of both the Thick-knee and the Kentish Plover; the latter bird was very numerous. In the north of the island, Canarian Rock Doves frequented the lava caves and probably bred there, although we did not find any nests.

On the 30th of May, the weather, which had been beautiful, changed for the worse, heavy clouds came up, blotting out the *risco* and even covering the central crater on Graciosa, and by evening it was pouring with rain. We spent another awful night, as the wind increased considerably, and the tents, though securely pegged down with great stones on the pegs, threatened to lift bodily from the ground and resembled balloons rather than tents. In the morning I was wakened early by the roar of the waves thundering upon the shore, but luckily the rain had ceased. Thinking the high wind might have compelled Waders to seek refuge here, we went a long walk round the reefs, always on the look-out for the Black Oystercatcher. We did not meet with it, however, but noted Kentish Plover, Grey Plover, Turnstones, Dunlin, Whimbrel, and one Green-shank. We also discovered a new breeding place of the Canarian Shearwaters. These were in burrows, like rabbit-holes, in the hard sandy soil below Montaña Amarilla, and these holes I believe to have been excavated by the birds themselves and not by rabbits; we intended at first to dig them out, but even our sharp trowels made little impression on the ground, which seemed to be of sandstone-like composition, and was in

fact composed of such hard, tuff-like substance, that we soon had to abandon the idea. This was a curious place in which to find these birds nesting; the spot is a quarter of a mile from the sea, under the shadow of the crater.

After dark I again returned to the big boulders on the coast, where we had first met with the large Shearwaters, intending to get some myself. It was a pitch-black night and I took my gun, intending to shoot the birds after switching a powerful electric torch on to them as soon as they settled on the rocks. This I found impracticable, but managed to stalk and capture one bird in this way, stunning it with the butt of my gun. A second attempt came very near ending in disaster, for as I was hastening towards my victim my torch suddenly failed, one false step, and gun, torch, and "stalker" fell over the edge of a small chasm. Luckily, the only damage was a broken stock to my gun.

We had intended moving camp to Montaña Clara on the morrow, but the old sailor whose boat was to take us over, said a landing was quite impossible until the sea went down, but to compensate us for our disappointment sent his little son to show us the largest nesting colony of Shearwaters, of which we had hitherto remained in ignorance. Our little guide led us straight away from the sea over the sand-hills and hummocks to the very centre of the island, and then commenced to scramble up the steepest slopes of the Montaña de las Agujas. The climb was very arduous on the crumbling surface of lava, tuff, volcanic ash, and pumice. Eventually the boy stopped at the entrance to what appeared to be a very small cave in the crater wall, 600 feet above the sea. The entrance was about 6 feet by 3 feet, and at the end

of the cave a narrow tunnel led into the crater. Into this the boy dived, beckoning me to follow. I could only just squeeze in and then was so cramped I could move neither hand nor foot, so the little boy tugged in front and his equally small companion pushed behind, and in this ignominious fashion I was literally propelled, in complete darkness, for fifteen or twenty feet. When just about stifling, we emerged into a small cavern, from which yet another tunnel branched at right angles, and through this we made our tortuous way, finally emerging into a good-sized cave which must have been about thirty feet from the entrance. The walls were honeycombed with holes and crevices which had been utilised by the Shearwaters; an indescribable smell of "Petrel" greeted our nostrils, and the floor upon which we stood was thickly strewn with the feathers of the birds. I was very unlucky in finding all the occupants out at sea. They had not yet begun to lay in this cave, although it was the 1st of June. The boy said they had only just arrived "to clean their nests," but we had already obtained a fair number of eggs from other parts of the island. The entrance to this particular breeding place must be a mile from the sea; and although, in the daytime, the birds were often seen flying up and down the strait which divides Graciosa from Lanzarote, yet they never by any chance came to their nesting holes before darkness had fallen. The outer walls of the crater in which this cavern was situated were full of similar caves and crannies, in which numbers of Canarian Shearwaters nested, and some of these we examined before returning to camp.

In the extreme north of the island, some large boulders lie at the foot of the low cliffs which here form the coast-line, and under these boulders we were assured that the Madeiran Allied Shearwater bred. Our

disappointment was great at finding these holes empty, and we were told by the fishermen that the "*Tahoces*" had already bred and gone.

The morning of the 3rd of June broke to a tearing gale, and it looked as if we were going to be imprisoned indefinitely. But it is an ill wind indeed that blows nobody any good, and on this day our luck was certainly in. To begin with, two beautiful eggs of the Thick-knee were found within a hundred yards of our camp, the nest not fifty yards from the sea. Soon after breakfast one of the fishermen, with most of whom we had by now become quite friendly, turned up with the thrilling news that his brother had seen a Black Oystercatcher the previous evening on the reefs of the west coast of the island. We seized our guns without a moment's delay, and with our new guide ran most of the two miles to the reefs opposite Montaña Clara. For fear of disturbing the bird, in case it should still be about, we crawled the last fifty yards through the prickly scrub which here fringed the shore, until we could gain a clear view of the reefs. Eagerly we scanned the black rocks, which here run some way out to sea, and suddenly the sharp eyes of our guide spotted the bird. It was feeding not a hundred yards below where we were lying, running nimbly over the rocks. Its presence would scarcely have been noted were it not for its brilliant red bill. We quickly made a détour to bring us out opposite where we calculated it would be, and as I raised my head, the bird got up, uttering a sharp "peepe-peepe, peepe-peepe," twice repeated. It was a long shot, but I dared not risk allowing the Oystercatcher to leave the island, so fired on my knees, and to my intense joy the bird fell into the sea, with a single pellet in its wing. The Spaniard who had discovered it was

scarcely less delighted than we were ourselves, and rushed headlong into the waves to retrieve the rare trophy. A good skin was made of this bird by Bishop, and it is now in the Museum of Lord Rothschild at Tring. (A coloured figure of this Oystercatcher appeared in the *Ibis*, 1914, Plate VI.)

After the shooting of the Oystercatcher, I ascended the Montaña Bermeja, 550 feet in height; the crater faces north and the walls are red in colour. The lava gives the volcano a curiously red appearance when the sun shines upon it. At the foot of the crater, which slopes steeply to the sea, lies a sandy bay, where I obtained some beautiful shells belonging to the genera *Patella*, *Anomia*, *Pecten*, *Modiola*, *Cardium*, and *Lima*. It is near here that the little Madeiran Allied Shearwaters breed under the big boulders on the shore; we examined their old nesting-places again, and satisfied ourselves that they had been occupied earlier in the season. The fishermen on Graciosa assured us that we should still find the "*Tahoce*" breeding on Montaña Clara, and we were anxious to prove whether this statement was correct.

We had now given up all idea of landing on the Roque del Este. If we could explore the remaining two large islets, I felt I should have to be satisfied. We had already been nine days on Graciosa instead of the seven as I had planned. On the evening of the tenth day we were sitting outside our tent, when we were astonished to see the sail of a little fishing-boat come round the point, from the direction of Montaña Clara. We watched it through our glasses, speculating as to what the man could possibly have been doing in such a sea. When almost opposite my camp, the helm was put hard over, and in another minute the boat had grounded on the beach. Several men jumped out

and made their way towards the tents, and as they drew near we noticed to our astonishment that their shirts were filled with birds! One by one they drew them out—seven Madeiran Allied Shearwaters (four adults and three young); fifteen Bulwer's Petrels and eleven eggs of the latter, together with a regular series of the large Canarian Shearwaters and their eggs. All the birds were alive. Knowing that I was growing anxious lest the Petrels should all have left Montaña Clara before we were able to land there, these excellent fellows had made a special trip in search of the birds for me, for, as they put it, they could anyhow swim ashore, if necessary, whereas it was quite impossible to bring a boat alongside and discharge tents and collecting-boxes, and the cumbersome impedimenta of a permanent camp.

The whole of the next day was passed in skinning the birds which we required, and most of the night in writing up diaries. For two more days the gale raged, but at length, on the 7th of June, the wind had dropped sufficiently to allow us to attempt a landing on Montaña Clara. I had engaged the largest boat on the island for this purpose, and by 6 A.M. the tents were down, and directly after breakfast we set out on the never-to-be-forgotten sail to the next island. Though such a short distance away, we had to tack four times in a sea which, to say the least of it, was rough. A scorching sun on one's back and clouds of spray in one's face do not help to stave off sea-sickness, and by the time we ran alongside a flat ledge of rock on Montaña Clara, I had had quite enough. At any rate we had arrived, though with only seven days in which to explore two islands instead of the fourteen we had hoped for.

CHAPTER XV

AN ORNITHOLOGICAL EXPEDITION TO THE EASTERN CANARY ISLANDS (*continued*)—MONTAÑA CLARA, THE ROQUE DEL OUESTE, AND ALLEGGRANZA.

WHEN we came to settling on a site for our camp on Montaña Clara, we soon discovered that we had very little choice indeed. The island is no more than the top of a gigantic volcano, which rises precipitously from the waves and attains a height of 700 feet above sea-level. Being anxious to camp this time in the midst of the Petrels, we pitched our tents within a few hundred yards of the sea, on a little plateau with the peak rising behind us, on the extreme southerly point of the island. The coast-line is very steep, and there was no question of being able to walk round the island, as in Graciosa. In appearance, Montaña Clara is roughly heart-shaped, and covers an area of half a square mile, being $1\frac{1}{4}$ miles in length and $\frac{3}{4}$ mile wide. There is only one crater, and this is imperfect, being open to the sea on the northern side. At all other points, save at the extreme south, the outer crater walls fall perpendicularly to the sea. The south of the island slopes gradually upwards and a certain amount of level ground is to be found there, in which little depressions afford shelter to the smaller birds and butterflies. This culminates in a steep ridge, 300 feet in height, sloping to the south-east and composed of lava and scoriæ, intersected here and there by miniature *barrancos*. Between the ridge

and the mountain, a number of small hills covered with loose lumps of lava, pumice, and fine ash, lie in a cluster. On the low ground a sprinkling of desert plants, among which were the prickly *Launcea spinosa*, *Suaeda fruticosa* with its purple bloom, and a number of ice plants, *Mesembryanthemum nodiflorum*, struggled through the volcanic débris. A single water-hole, entirely dependent on the meagre rainfall for its replenishing, constituted the only drinking water to be found.

The heavy seas thundering and crashing against the cliffs have helped to form many caves, which abound in nooks and crannies and to which the Rock Pigeons resort, and at times rarer "visitors" also, as will be seen. Underneath the cliffs, huge boulders, which have fallen from above during a landslide, line the shore, and it is partly due to the erosion which has taken place on the island that Montaña Clara is the favourite breeding station in the Archipelago of two of the most interesting of the Tubinares—the Madeiran Allied Shearwater and Bulwer's Petrel. Nowhere is there any sand on the shore, and at low tide the rocks abound in deep pools; it is therefore an ideal hunting-ground for the Black Oystercatcher. Montaña Clara is a real desert island, entirely uninhabited by man, visited by hundreds of Petrels and Shearwaters in the breeding season, and, as will be seen hereafter, those are by no means the only interesting birds to be found upon it. A surprise was in store for me which even the most sanguine of ornithologists could not have hoped for.

The night of the 7th of June was one of the weirdest I have ever spent; sleep was almost impossible, as anyone who has spent a "first night" on a Petrel's breeding-ground will readily understand. From 8 p.m. until dawn the cries of the birds never ceased—some



The Home of Meade-Waldo's Black Oystercatcher.



Montaña Clara.

seeming to come from a bird perched on the top of my tent! The birds flew low over the camp and the swish of their wings was plainly audible. Now and then a much pleasanter note, that of Bulwer's Petrel, could be distinguished, but on my first night on the islet I had no idea to what species it belonged. When we came to examine the ground in the immediate vicinity of the camp, we were no longer surprised that sleep had been difficult. In every hole and cranny under the shelving ledges and even in burrows on a plateau near the summit of the volcano, 600 feet above the sea, the large Canarian Shearwaters were breeding. A few burrows were also found in the sand-hills. The sand in which the Shearwaters had burrowed on Montaña Clara was much softer than that of Graciosa, and I was thus able to excavate here with comparative ease. I found the burrows very similar to rabbit-holes but a little larger; the entrances of several measured 6 by 11 inches, and often the tunnel led 7 feet into the ground. The egg was usually deposited a foot from the farther end of the burrow. The passage was generally winding, and at times turned completely at right angles. A few feathers and scraps of seaweed were sometimes found doing duty for a nest. In contrast to these long burrows, I was often surprised to find a bird sitting, in broad daylight, having laid its egg in an exposed crevice on the cliff-side, not 12 inches from the entrance, where, in the daytime, the rays of the sun shone full upon it. If molested, the Shearwaters bit and scratched with remarkable ferocity, inflicting severe wounds with their formidable bills. As I finally left the breeding haunts of these Shearwaters on June the 14th, I did not find a single nestling. Several fishermen, who knew their habits well, told me that the "*Pardelas*," as they called them, arrived early in April

“to clean their nests.” As I proved for myself, nesting had become general on June the 1st and most of the birds seemed to have laid. The young are hatched early in July, and the fishermen start taking them about August the 5th, for eating purposes. Many hundreds are taken again in September, when the young are exceedingly fat and are then boiled down for oil. A great number of the old birds are also captured for the sake of their feathers. The men assured me that all the birds leave the island in November, young and old together. During my three weeks’ visit to these outer islets, I took considerable pains to discover what rule governed the comings and goings of these Shearwaters between the sea and their nesting sites. Living as I did on Graciosa and Montaña Clara in their very midst, I hoped to be able to arrive at some definite conclusion on this somewhat little known subject. With this object in view, I made many journeys to different nesting places after dark. Before laying had become general (*i.e.*, during my stay on Graciosa), the majority of the birds would leave their nests before it became light, spending the entire day at sea. They must be excellent time-keepers, for in many cases no inkling of daylight could possibly reach them to warn them that the dawn was breaking. Unless, therefore, they leave their holes before daybreak, while it is still dark, I do not believe that they leave them until dusk, and possibly not until the following morning. If, however, they have been out to sea throughout the day, they return to land about an hour after darkness has fallen (*i.e.*, about 8 P.M.). As soon as they begin to come in, they start calling—a long drawn-out wailing note, several times repeated, and often answered from within the ground by a peculiar purring sound, which I imagine is made by the mate. The birds would fly round several times in

lessening circles close above the rocks, eventually settling at the entrance to their particular holes.

By June the 7th, the day on which we left Graciosa, all the birds had eggs, and they were likewise all "sitting" on Montaña Clara, the Roque del Oeste, and Allegranza. Although over a hundred birds were caught, the majority being again liberated, I never once found more than one bird in a hole. Both males and females were taken on the eggs in about equal numbers; the sex of the sitting bird is easily distinguishable, as the male has a much heavier bill than the female. Only one egg, of course, is laid, and considerable variation in size is shown. I think there is no doubt that the birds take it in turns to sit on the egg, the male feeding while the hen is sitting, and *vice versa*.

The Shearwaters called during all hours of the night, but seemed particularly noisy about 3 A.M., at which time I believe many went out to sea. If pulled out of their holes in the daytime they seemed completely dazed, and as often as not made no attempt to escape; others would waddle in the direction of the sea, continually catching their wings in bushes and on stones and tumbling about in the most grotesque manner. When thrown up in the air, some would immediately fly out to sea, while others seemed to lose their power of flight and would come down "plump" on to the rocks, and would quickly waddle away until they could gain a ledge from which to "push off." Where the birds go to between the end of November and the end of February is still a mystery; moreover, we are still without a clue as to whence the Shearwaters have come which visit the North American coasts—in the neighbourhood of Long Island—at a time when the birds in the Azores, Madeiras, Salvages, and Canaries are breeding. Although these birds in American waters

are not yet known to breed anywhere on that side of the Atlantic, I shall be surprised if they are not found breeding there in the future. American ornithologists say that they are indistinguishable from the Canarian race. British ornithologists, on the other hand, are inclined to consider them distinct. The point must be settled by the "Systema Avium" Committee.

Two days after our arrival in the island a remarkable discovery was made. Taking a stroll with his gun round the low ground, Bishop shot two Chats, which at the time I took to be the Fuerteventuran Chat—a sufficiently strange discovery even if this had been the case, as there are no Chats in Lanzarote or Graciosa. There were four birds together just behind the camp, but after the shot the others disappeared and were never seen again. Judge of our surprise to find that they were not examples of the Fuerteventuran Chat at all, but belonged to an entirely new and unnamed race. I have since named this little bird *Saxicola dacotie murielæ*. Whether the Chats were on migration is difficult to say; subsequently Bishop found them much more plentiful on Allegranza, but though I searched high and low for five more days I never saw a sign of these little birds again.

I had arranged with the boatmen to call at our island on a certain day, and had decided, as we had so little time left, to send my taxidermist to Allegranza with Juan, and to remain in, and thoroughly work, Montaña Clara myself. This arrangement was adhered to, and just after the new Chats had been obtained, I saw the little boat scudding over the waves from Graciosa. One of the sailors—Jorge, by name—remained with me to aid in the search for birds, and the others set sail for Allegranza to complete the exploration of that island.



The North-west Coast of Montaña Clara.

[To face page 308

The 9th of June was notable for still another discovery. Jorge and I had been searching along the cliffs for Bulwer's Petrels, and had already obtained several, when we came to a rocky cove in which were a number of caves. The sea was out, and Jorge, who climbed like a cat, swarmed down to see what he could find, while I sauntered back to camp. I had not been in long when I saw Jorge flying along in a great state of excitement, and from the bottom of his basket, wrapped in cotton-wool, he brought a Storm Petrel—the "*Alma Mestres*" as he called it. He had, he explained, pushed his almond rod into a hole in one of the caves, when out flew the bird into his face. Round and round the cave flew the dazed Petrel, and after it dashed Jorge, who eventually succeeded in capturing it in his hat! This is the first occasion upon which the Storm Petrel has been taken on shore in the Canary Islands. We never discovered another, but there is no reason why it should not breed somewhere in the Archipelago.

My list of birds from Montaña Clara increased daily; we even discovered butterflies on this deserted isle, and caught a beautiful Clouded Yellow, of which species several examples were seen. Painted Ladies were common and we also captured a Silver Y. moth. The weather had turned quite cold, and the strong wind which troubled us so much on Graciosa sprang up and increased in violence. The camp was too exposed to the weather, as can be seen by the illustration facing page 312, and we spent more than one anxious night.

The two baby Doves I had bought in Lanzarote were my constant companions and thrived splendidly on *gofio*,¹ soon becoming extremely tame. Most of the

¹ The principal food of the poorer classes in the Canaries. It consists of ground Indian corn (maize) which has been roasted.

day they would sit on the top of the tent or in a sheltered spot on the ground, enjoying a sun and dust bath, but in the evening flew back into the tent and slept on anything they could find to perch on, for choice, my pith helmet.

I had not yet ascended the volcano, so the day after the boat had gone to Allegranza I set out to climb the cinder heap to the top by a villainous track composed for the most part of loose lumps of lava and ashes. "*Pardelas*" were found breeding at every elevation, in every hole we passed. Having reached the summit of the crater ridge at 600 feet, we crossed a plateau sloping gradually to the opposite ridge; the ground on this plateau seemed almost sandy, and being less hard, we discovered more Canarian Shearwaters in burrows. Having gained the inner rim of the volcano we gazed down into the mouth itself; the north wall of the crater has burst away, and thus we looked through the rift down on to the sea beneath. The Roque del Oeste lies not far from the northern extremity of the island, a small pile of lava fully exposed to the fury of the Atlantic. I had already determined to land upon it, if possible. In the distance Allegranza stood out in bold relief. Far below us, in the basin at the foot of the inner walls of the volcano, lay huge boulders which had fallen from above; a more likely place in which to search for Petrels could not be imagined, for although the northern wall was open to the sea, affording easy access to the birds, it was impossible to land there, and the only way to reach the interior of the volcano was by the route we had come.

Gradually we began to descend, the ground becoming steeper at every step. We had got half-way down without any mishap, over the most slippery rocks I had ever scaled, when we came to a long stretch of

flat slabs, lying at an appalling angle, and which, I could see, slightly overhung the edge. Beyond, was a sheer drop of several hundred feet. I then felt quite relieved that I had arranged for a boat to be sent from Graciosa, the moment a bonfire was lit on the summit of Montaña Clara—a sign which could be seen by day or by night—and which would indicate that a serious accident had taken place!

The first ten steps I took on that ledge, I knew my quest was hopeless. My boots slipped on the smooth surface as if they had been skates on ice, and I had to confess that I was beaten. Jorge slipped a short thin rope round my waist, and feeling like a performing bear I was ignominiously led back into safety! Jorge was never daunted, however, and in his bare feet managed to scramble over the treacherous surface, at length gaining the floor of the volcano, where I watched him enviously through my powerful glasses, searching carefully under the fallen boulders. He soon discovered a Petrel, and pulling it out, held it up for my inspection. It was the little Madeiran Allied Shearwater, and before long, a small series of immature birds and two eggs of this species had been obtained. As this spot was quite inaccessible after dark, I failed to secure a series of adult birds, though several of the birds of the year were practically in adult plumage and could only be distinguished by one or two downy filaments adhering to the feathers on the flanks. This was the fourth species of the Order which we had discovered on this tiny island and the third which we knew to be breeding. When we set out upon our homeward way the day was far advanced, and in the evening light we had a glorious view over Graciosa and of the western coast of Lanzarote; against the dark horizon the dim outline of the Roque de l'Este—the most inaccessible

of all the outer islets—could just be made out, a thin line of white foam showing where the big Atlantic rollers were dashing themselves against this massive rock, the only visible remains of a gigantic volcano beneath the waves.

I did not altogether like the look of the weather, and took the precaution of burying all the tent pegs deep in the ground. It was well that I did so, for it turned out a wild and restless night. Sleep was soon impossible, as the wind flapped the sides of the tent and whistled through the ropes as it does through the rigging of a ship. The waves were thundering on the reef just below the camp, and the ceaseless cries of the Shearwaters seemed raised in defiance of the elements. The storm ceased as quickly as it had begun, and the following day broke fine and clear; a stiff breeze was still blowing, and I doubted whether the boat with her cheery crew would call, as I had arranged, to land me on the Roque del Oeste. I had not long to remain in doubt, for a sail was sighted dancing over the waves, fast drawing nearer to the island, and soon the *San Francisco* swung into my little creek, where the water was comparatively calm. The owner of this—the best boat from Graciosa—was a most delightful character, and with his five sons, one of whom was Jorge, always manned his own boat. The costumes of the crew were highly picturesque and lacked nothing in colour—the usual patched blue trousers, often alternate squares of dark and light blue, the shade depending on the length of time each patch had been exposed to the weather! They wore red, yellow, or blue shirts, with bright coloured sashes bound loosely round their hips, and very large, curiously shaped straw hats, having enormous brims and very high crowns, which resembled flower-pots turned upside down. The



The Camp on Montaña Clara.



The Crew of the *San Francisco*.

owner of the *San Francisco* and his five splendid sons seemed to be relics of Spain's glorious days, when she could boast of adventurous mariners, and was second to no nation in the world. Alas! how far distant those days seem to be now.

Feeling none too happy at the prospect before me, I once more boarded the little boat and we set out for the rock. At first we had to row to catch the breeze, but once out of the shelter of the island the sail bellied out and we went racing through the waves at top speed. We mercifully had only to tack once to make the rock, but by the time we arrived were all soaked to the skin, and the boat had shipped more water than I cared about. It was one thing to get within fifty feet of the jagged lumps of lava, of which the Roque del Oeste seemed to be entirely composed, but quite another to land upon it. For twenty minutes we hung just off the ledge upon which we were to attempt to jump, the waves leaping six or ten feet up the face of the rocks. The man who was going ashore with me made several attempts to land, and twice got a footing on the lava, but on each occasion he was swept off his feet with the water above his waist, and had to cling on to the gunwale of the boat as she receded. We then tried a little farther to the west, and this time the fisherman succeeded, but I had no time to jump before we were sucked back again into the swirling waters. Once more the boat was brought with marvellous seamanship close alongside, and jumping with all my might I landed with a crash up to my knees in the water. The "*Roque Inferno*," as it is affectionately called by the Graciosan fishermen, certainly lives up to its name! The smallest of all the outlying islets, it only embraces an area of some 40,000 square yards and I reckoned that it was, by my aneroid, 30 feet above sea-level at the highest point.

A more desolate spot it would be hard to imagine. It is made up entirely of enormous blocks of lava and of shelving walls of basalt. The lava was so jagged that it everywhere afforded a safe foothold, and I soon swarmed all over the rock, searching carefully for any Petrels which might here be hidden away. I still had hopes of finding either the Manx, the Frigate, or the Madeiran Fork-tailed Petrel somewhere in the Canary Archipelago. I am now, however, almost sure that these species never visit the islets except as "visitors."

Although I had been informed that there were no birds on this rock, I had soon noted quite a number. The big Atlantic Shearwaters were nesting on all sides, and to my surprise I saw three birds of prey here, a fine Osprey sailed out from the highest point and a Kestrel was perched on a lava block, though I doubt whether either would think it worth their while to breed there. Rarest of all, I caught a momentary view of a fine Barbary Falcon, which had evidently been settled somewhere on the rock, and which dashed past me like a flash. Yellow-legged Herring-gulls took little notice and remained basking in the sun. I believe they breed on the Roque del 'Este. There were four different plants on the Roque del Oeste, but, though I obtained specimens of all, they were unfortunately destroyed before they could be identified; the ice plant (*Mesembryanthemum*) was certainly one of them and I found it scarce, but growing in patches here and there. Having satisfied myself that there were no hidden Petrels or Shearwaters other than those we had seen, we returned to the *San Francisco*, and after many attempts, scrambled on board with our spoils and set sail for Montaña Clara.

On the following morning I had my first really good view of the Barbary Falcon; I had started a couple of

Rock Doves from one of the caves below where I stood at the edge of the cliff, and as these birds dashed out over the sea, the Falcon fell like a stone from the heights above, where it had evidently been on the watch. As the Peregrine stooped, the Doves, with a dexterous turn of the wing, escaped the murderous talons by what appeared to be a hair's breadth, and continued on their way unharmed; the Falcon then rose in the air, and giving up the chase, leisurely returned to its former resting-place. I then had a clear view of the bird, as it passed very close to me, and I could clearly discern its black cheek patches. This was, of course, *Falco peregrinus pelegrinoides*, which is reported to have bred on Montaña Clara, and probably does so annually. Although most anxious to possess a specimen, I could not bring myself to fire at this magnificent bird, though I could hardly have failed to hit it. Egyptian Vultures and Ospreys, Kestrels and Ravens were all noted on Montaña Clara, and doubtless breed on the inaccessible cliffs on the west of the island. Rock Pigeons were not numerous, but a few pairs undoubtedly breed in the caves. Another bird which I believe was nesting, was Brehm's Pale Swift. A single House Martin was observed, a passing migrant. The only other birds seen on this island besides those already noted in this chapter were Berthelot's Pipits and Yellow-legged Herring-gulls, the former in full moult.

On the 14th of June we left Montaña Clara, having thoroughly explored every crevice we could reach. My boatmen came for me at 6.30 A.M., and three hours later we were dancing over the waves in the *San Francisco* on our homeward way. Another boat had gone to Allegranza to pick up the rest of the party, whom we had arranged to meet at Haria. The sail to the foot of El Risco, where I bade a sad farewell to Jorge and

his sailor family, was uneventful; my baggage was carried on to Orsola, where it had been arranged that camels should be in waiting. We now commenced the arduous climb to the summit, which towered 1500 feet above us, and a more fatiguing scramble I have never experienced. It had been bad enough coming down, but the ascent was a great deal worse and took a full hour to accomplish. The thermometer, at the foot of the great cliff stood at 100° in the shade, and before we gained the summit, both José and I could have wrung out our clothes. As we passed over the top, a chill wind was blowing and we could hardly see fifty yards ahead of us for cloud. I expected to find a riding camel here, and looked anxiously around for any sign of the beast. Suddenly, through a clearing in the mist, we spied it, barely a quarter of a mile away, standing motionless by its driver, who had drawn his *manta* close round his shoulders. While we hurried towards it, the clouds came down again and blotted everything from view. Whether I lost my direction or what happened, I cannot imagine, but it took me half an hour to find that camel, which I had by this time concluded was a phantom beast! but at last we saw it again, walking leisurely away from us, and this time we had no intention of letting it escape us. At Haria I met Bishop and Juan, and learnt that the former had been very successful in Allegranza, having obtained a series of the new Chat, a Slender-billed Barn Owl, and a Buzzard. He had also made a representative collection of all the other resident birds. A list of these birds has already appeared in the *Ibis*, 1914, pp. 84-87, in which Journal I published the scientific results of this expedition.

From Bishop I learnt that Allegranza is almost round in shape, and that it contains three extinct

volcanoes, the highest, Montaña de la Caldera, rising to 940 feet. The rest of the island is for the most part flat and is made up of low hills, lava-covered slopes, and stony plains. The usual vegetation of the Eastern Canary Islands was met with, a special feature being *Euphorbia* bushes with enormously thick stems. Wheat was cultivated in small patches. The only inhabitants were the lighthouse-keeper and the majordomo, with their respective families. I was disappointed to learn that the only Petrel or Shearwater found there was the large Canarian Shearwater, which was found all over the island, as it was on Montaña Clara and Graciosa, occupying every hole and cave available. I suspect that it is on account of the prodigious number of these large Shearwaters that more of the smaller members of the Order do not resort to these islands to rear their young. Allegranza is only 103 miles from the African coast, and being a small island, only $2\frac{3}{4}$ miles long by $2\frac{1}{4}$ broad, with an area of $3\frac{3}{4}$ square miles, it is probably one of the best points from which to observe the passage of migrants through the Canary Archipelago. It is still my dream to spend a spring or an autumn on this far-away isle.

We camped that night beyond the town of Haria, close to the main road, and the following day crossed the high ground of the Monte Famara, and descended the winding road to Arrecife, which is anything but a pleasant spot. As we arrived on a Sunday, our camp on the outskirts was soon surrounded by the entire child population of the town. Throughout the day, long strings of camels, heavily laden with onions, the main articles of export, passed along the road, the head of each animal tied to the tail of the beast in front. A more dusty sun-baked spot I cannot remember, and but for a most interesting visit paid to a local ornithologist

and taxidermist—Don J. Gonzalez y Gonzalez—our stay there was devoid of interest, and we were all heartily glad when the hour came to board the little inter-insular steamer and literally shake the dust and onions of Arrecife from our feet!

We called once more at Puerto Cabras in Fuerteventura and again at Gran Tarajal, the tiny port which we had visited on our outward journey. This time we went ashore and were carried through the surf on the broad shoulders of the Spanish lighterman, getting uncomfortably wet during the process. The valley of Gran Tarajal is thickly lined with tamarisks, but the steep walls of the *barranco* are rugged and barren. As we proceeded, the valley opened out, the tamarisk scrub became thinner and patches of ground were under cultivation. Immediately before us, a group of low hills obscured the great plains leading to the heart of the island—plains which I some day hope to explore again. Two clumps of feathery date-palms standing at the foot of the hills were silhouetted against the sky, and as the sun was rapidly sinking behind the distant hills, we slowly retraced our steps to the sea, sad to leave, perhaps for ever, this island which holds such a strange fascination.

The *La Palma* was soon under way and throbbing steadily down the coast, past the "*Matas Blancas*"—the isthmus of white dunes, shimmering in the moonlight like silver sand. The flashing beams from the lighthouse on Punta Jandia were the only sign of habitation on all this lonely coast as we drew parallel with the mountainous heel of the island and passed beyond the shelter of the land.

APPENDICES

APPENDIX A

NOTE ON A FALL OF DUST, "BLOOD-RAIN," AT GRAN CANARIA, 8TH TO 11TH FEBRUARY 1920. By W. CAMPBELL SMITH, M.C., M.A., F.G.S., Assistant in the Department of Minerals, British Museum (Natural History).¹

A very prolonged fall of dust of the kind known as "blood-rain" or "red-rain" was experienced in Gran Canaria from 8th February to the 11th, 1920. On 10th February Mr David A. Bannerman, who was then on a scientific expedition to the Islands, carefully collected a sample which he forwarded to the British Museum (Natural History). The following is an extract from his letter of that date: "We are suffering here from a terrible so-called 'Sand-storm,' the worst known for years. (The dust) appears over the sea as a thick mist, which gradually envelops everything. We can see about a quarter to half a mile, but sometimes not 200 yards. Shipping is entirely disorganised, and many boats are lying outside apparently afraid to move. The dust finds its way into everything, through barred doors and windows, and is making life here very miserable. The 'storm' commenced on the afternoon of the 8th with a very high south-westerly (?) wind. The entire island is affected. It cleared slightly on the afternoon of the 9th, but is worse than ever to-day (10th).

"P.S.—11/2/20. Pouring in torrents: dust-storm ended."

The sample of the dust collected by Mr Bannerman is pale brick-red in colour. It appears to be quite free from foreign matter. When examined under the microscope it is seen to consist mainly of minute grains of quartz, reddish opaque grains of clayey material, highly birefringent grains or rhombs of calcite or dolomite, and, much more rarely, fragments of other highly birefringent minerals, and some

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fragments of organisms. The dust effervesces briskly in dilute hydrochloric acid.

ORGANIC REMAINS. *Diatoms, etc.*—Gen. Sir Nicholas Yermoloff kindly examined the dust for remains of diatoms, and the following extract is from his report:—"The slide contains a few diatoms similar to those from the East African fossil freshwater deposit: *Melosira granulata*, *Rhopalodia gibba*, a species of *Eunotia* and *Stephanodiscus astræa* often accompanying *Melosiræ*. . . . The slide contains only one diatom not contained in the East African deposit, but this diatom is very common everywhere."

The dust was examined further by Mr A. Gepp of the Botanical Department and by Mr R. Kirkpatrick of the Zoological Department (British Museum). They recorded, in addition to diatoms, silicified stomata possibly of grasses, and minute spiny fragments of uncertain nature, but probably parts of plants. More rare are particles of shells of marine foraminifera (*Perforata*) and fragments of siliceous sponge spicules with central axial canal, which may belong to either freshwater or marine sponges. There are also some minute siliceous or silicified spherules of uncertain nature.

MINERAL COMPOSITION.—The grains composing the dust average 0.07 mm. in diameter, but a few reach 0.15 mm.

A separation in a dense liquid showed that not more than one or two per cent. of the grains have a density higher than 2.7. In the concentrate of the denser material the most abundant mineral is augite. This occurs in idiomorphic crystals, 0.08 by 0.04 mm., and pale mauve in colour. Next in importance, and all in about equal amount, are: a basic plagioclase-felspar (labradorite?), green hornblende, brown biotite, and a black opaque mineral, probably ilmenite. Much less abundant are minute idiomorphic crystals of zircon and pale brown tourmaline, with traces of a brown mineral which may be rutile.

The portion of the dust containing the lighter constituents was treated with dilute hydrochloric acid. It effervesced briskly for a few seconds. The residue left after thus removing the carbonates, and after washing off the lightest material, was found to consist mainly of grains of quartz and of an opaque

brown clayey material, together with a much smaller quantity of plagioclase-felspar and occasional flakes of biotite and hornblende.

CHEMICAL COMPOSITION.—A partial quantitative analysis was made on 0.79 gms. of the dust, the result of which may be expressed as follows:—

	Per Cent.
Hygroscopic water (loss on ignition at 105° C.)	3.99
Combined water and organic matter + CO ₂ combined with FeO	8.31
Insoluble in dilute hydrochloric acid	67.25
Soluble in dilute HCl: (Al ₂ O ₃ , Fe ₂ O ₃ ¹)	1.99
Calcium carbonate (calculated from 9.04 per cent. CaO)	16.14
Magnesium carbonate (calculated from 1.11 per cent. MgO)	2.32

The above analysis shows that calcium and magnesium carbonates make up 18.5 per cent. of the dust. This was observed under the microscope as highly birefringent grains and rhombs of calcite. The low content of Al₂O₃ and Fe₂O₃ in the soluble portion indicates a general absence of free alumina and is an indication that the dust is not derived from lateritic deposits.

COMPARISON OF THE DUST WITH OTHER RECENT FALLS IN THE CANARIES AND AZORES.—A sample collected in Gran Canaria about 1895, kindly sent by Mr S. H. M. Head of Las Palmas, seems very similar in composition to the 1920 fall, but is much finer in grain and contains more abundant clayey material.

The largest grains are 0.02 mm. in diameter and the average is between 0.008 and 0.004 mm. Traces of green hornblende and of (?) rutile are present.

Major F. A. Chaves collected a sample of a fall at S. Miguel, Azores, on 20th February 1903. This was examined qualitatively by Dr G. T. Prior. The portion insoluble in hydrochloric acid contained organic matter, SiO₂, Al₂O₃, FeO, CaO, and MgO. The soluble portion consisted of CaO, MgO, Fe₂O₃, and Al₂O₃. Calcium carbonate formed 15 per cent. of the dust. A separation with dense liquids showed it to consist mainly of clay and calcite, with only a little quartz and felspar

¹ Al₂O₃ and Fe₂O₃ were not separated. The bulk of the precipitate here is probably due to iron, some of which may be present in the dust as carbonate.

The heavy minerals, which were present in very small amount, were magnetite, basic plagioclase, and augite. The augite is quite similar to that found in Mr Bannerman's sample. Diatoms are rare, but a species of *Melosira* is recognisable. Dusts collected during the same fall in S. Maria and S. Jorge showed less volcanic material, and consisted mainly of calcite and red clay with a few remains of plants. All three of these dusts are very fine in grain, the grains averaging 0.01 mm. in diameter. They differ from Mr Bannerman's sample in the greater preponderance of clay and calcite and the comparative scarcity of quartz.

THE SOURCE OF THE DUST.—Falls of dust, or "dust-showers" of the kind described above, are by no means uncommon off the north-west coast of Africa; and, less frequently, falls of similar, though finer, dust have been recorded from time to time in Sicily, Italy, and even as far north as Northern Germany and the south of England. These more distant falls have been usually accompanied by rain and have been described as "blood-rain" or "red-rain." Similar phenomena have also been recorded in Australia.

Darwin and other writers, who described the dust-showers off the African coast, had early indicated the deserts of Africa as the most probable source of the material, and it seemed only natural to attribute to a similar origin the closely related phenomena of the more distant European falls of "blood-rain." Some doubt was, however, cast on this theory by the writings of Ehrenberg. This author in 1847 published results of the microscopic examination of many samples of these dusts, paying particular attention to the remains of diatoms identified therein.¹

He identified sixty-seven species and stated that he recognised none as peculiar to Africa, while two he knew of as only living in South America. He advanced the theory that the dust travelled for great distances in the upper levels of the atmosphere, and inferred that some of the material was derived from South America. Though finding little actual

¹ Ehrenberg (C. G.), "Passatstaub und Blutregen, ein grosses organisches unsichtbares Werken und Leben in der atmosphäre. Abh. Ak. Berlin, Wiss" (*Phys. u. Math. kl.*), 1846-7, pp. 269-460.

support, Ehrenberg's opinion has been quoted frequently in text-books and in descriptions of "blood-rain," and the theory of the African origin of the dust has been stated with less confidence in consequence.

The African origin of the whole of the European falls may be regarded as having been finally established by the work of Hellmann and Meinhardus on the dust-falls which occurred in Italy and Northern Germany between the 9th and 12th of March 1901.¹ These authors collected all the available data of these falls all over Europe and, taking advantage of the fact that the area of the falls was one well provided with meteorological stations, they worked out the relation between the times of fall and the nature of the dust and the meteorological conditions. They were able to show that the magnitude of the particles of dust decreased from south to north, and also that the dust became poorer in quartz grains and richer in light clayey matter as it travelled north. They showed that dust-storms had been recorded in Algeria between the 8th and 10th of March, and that there was, during the period of the falls, a south to north stream in the upper levels of the atmosphere, the measured velocity of which corresponded with the rate of travel of the dust, as shown by the times of fall recorded at widely separated localities.

The dust suffers in its long journey so much loss of the heavier constituents that it is difficult on purely chemical grounds to prove its derivation from the desert sands. There is, however, among the various analyses of European falls a sufficient degree of agreement to indicate that these have a common origin. On the other hand, analyses of Australian "blood-rain" show distinct differences from the European falls, indicating that these are derived from a different source—the deserts of Australia.

The fact that the dust-showers occur far more frequently off the north-west coast of Africa than they do in Southern Europe, accords with the direction of the winds prevailing over Northern Africa in the winter months. This is shown by the following extracts from Colonel H. G. Lyon's Presidential

¹ Hellmann (G.), and Meinhardus (W.), *Abhandl. K. Preuss. Meteorol. Inst.*, 1901, Bd. 2, No. 1. Der Grosse Staubfall von 9 bis 12 März, 1901, in Nord-Africa, Sud und Mittel Europa.

Address to the Royal Meteorological Society in 1917 on "The Distribution of Pressure and Air Circulation over Northern Africa."¹

Colonel Lyons describes the general normal distribution of pressure in the winter months, November to March, as characterised by the high pressure area extending from the Azores over Northern Africa, with an area of low pressure to the south of lat. 10° N. extending east and west across the continent. In January and February the resultant winds, taken from observations extending over periods of up to ten years, are W. and S.W. at the Azores, E. and N.E. at the Canaries and over the French Sahara. Travellers have recorded east as the predominant wind at Zinder and Lake Chad in January. Considering the conditions at higher altitudes Colonel Lyons has computed the direction of the mean isobars from such data as are available:—"In January the distribution of pressure at 1000 metres approximates closely to that at sea-level. At 2000 metres the high pressure over the French Sahara is still well defined, and it would appear that the N.W. to N.E. winds of the northern part, as well as the N.E. winds of the southern, extend up to this level ordinarily at this time of year. In Nigeria, Senegal, etc., these winds would be the dust-laden Harmattan winds of the winter months which carry westwards the fine dust from the desert regions of the Sahara. At 3000 metres the different areas of circulation have become merged in a general east to west sweep of the isobars, the highest pressures being at the Equator, whence a gentle gradient slopes northwards."

In the Mossi region, between lat. 15° N. and 11° N., long. 0° W. and 3° W., Hubert has recorded the prevailing N.E. and E. winds of the winter months as extending up to 2000 metres as shown by cloud-motion.

From the above data it is clear that there is generally an east to west stream in the upper air, such as could carry the fine dust of the Sahara out over the Atlantic, but the rarity of meteorological stations in N.W. Africa and the outlying islands prevents any exact correlation of the dust-showers with the wind conditions such as Hellmann and Meinhardus were able to achieve in Europe. In future this correlation may

¹ *Quart. Journ. Roy. Met. Soc.*, 1917, vol. xliii, pp. 113-150.

be possible, but for the fall of 1920 the only useful wind records at present available are those taken at Madeira, which are given in the following table :—

Date.	Time.	Bar.	Temp.	Wind Direction.	Wind Force.	Weather.
8/2/20	6 P.M.	1023.1	64	S.E.	4	...
9/2/20	7 A.M.	1024	61	N.E.	4	...
"	6 P.M.	1024.3	59	N.E.	4	rain
10/2/20	7 A.M.	1023.5	61	N.E.	4	rain
"	6 P.M.	1023.9	63	E.	3	...
11/2/20	7 A.M.	1025.3	61	S.E.	5	rain
"	6 P.M.	1024.7	61	S.E.	4	rain
12/2/20	7 A.M.	1023.1	61	S.	5	rain

APPENDIX B

LIST OF THE BIRDS OF THE CANARY ISLANDS

(Giving the status which each bird holds in the Archipelago.)

For full details of the migratory birds of the Canary Islands, together with detailed references to the occurrences of the Occasional and Rare Visitors in the Archipelago, my papers in the *Ibis* should be consulted, *vide* January, April, July and October numbers (1919), January, April, and July numbers (1920). Every species included in this list is dealt with at length in the *Ibis* papers.¹ Only those records which I believe to be really genuine have been taken into consideration. Erroneous records were dealt with at length in the *Ibis* (*loc. cit.*) but are not chronicled here.

Binomials are employed when it is not certain which race has occurred.

In dealing with the *Birds of Passage* in the following list, it must be remembered that ornithologists are very scarce in the Canary Islands, and that because a species has not actually been recorded from a particular island, it must not be inferred that it never occurs there. Islands are only specifically mentioned by name when authentic instances of the bird having occurred there are known.

- ¹ Part I. Jany. 1919, pp. 84-131, *Corvidæ—Sylviidæ*.
" II. April 1919, pp. 291-321, *Turdidæ—Hirundinidæ*.
" III. July 1919, pp. 457-495, *Picidæ—Sulidæ*.
" IV. Oct. 1919, pp. 708-764, *Anatidæ—Laridæ*.
" V. Jany. 1920, pp. 97-132, *Alcidæ—Phasianidæ*.
" VI. April 1920, pp. 323-360, Appendix A and Appendix B.
(Doubtful and unreliable records.)
" VII. July 1920, pp. 519-569, General Conclusions and Summary.

The following is an explanation of the terms used in the Lists:—

TERMS TO BE USED

Residents.—Birds generally found in the Canary Islands throughout the year, which regularly breed in the Archipelago, and which are not migratory in any way except perhaps between the Islands, are included in this category.

Partial Residents.—Birds which are usually resident and breed in the Islands, but which have their numbers augmented by fresh arrivals at certain seasons.

Summer Visitors.—Birds which are found nesting regularly in the Canary Islands, but do not remain throughout the winter in the Archipelago.

Winter Visitors.—Birds found in the Canary Islands during the winter only, and which have only exceptionally been known to breed in the Archipelago.

Birds of Passage.—Birds which pass regularly through the Islands during the spring and autumn migration periods.

Annual Visitors.—Birds which visit the Archipelago annually but at no fixed season of the year, and which have not been known to breed in any of the Islands.

Occasional Visitors.—Birds which do not occur regularly in the Archipelago every year but which have been recorded from time to time, almost invariably during the migration period. None have been known to breed in the Islands.

Rare Visitors.—Birds which have occurred in the Islands on two or three occasions only, sometimes singly after violent storms, but more often in company with other species during migration.

SYSTEMATIC LIST¹ OF RESIDENTS, AUTHENTIC MIGRANTS,
AND ACCIDENTAL VISITORS.

1. **Corvus corax canariensis.** Canarian Raven.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Montaña Clara, Allegranza.
2. **Corvus monedula.** Jackdaw.
Status—A rare visitor. Recorded from Tenerife.
3. **Pyrhcorax pyrrhcorax.** Red-billed Chough.
Status—A resident species.
Habitat in the Archipelago. Palma.
4. **Sturnus unicolor.** Sardinian Starling.
Status—A rare visitor. Recorded from Tenerife.
5. **Sturnus vulgaris vulgaris.** Starling.
Status—A bird of passage and winter visitor to the Archipelago.
Recorded from Tenerife, Fuerteventura, and Lanzarote.
6. **Oriolus oriolus oriolus.** Golden Oriole.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, and Lanzarote.
7. **Chloris chloris aurantiiventris.** Golden-bellied Greenfinch.
Status—A rare visitor. Recorded from Gran Canaria and Tenerife.
8. **Carduelis carduelis parva.** Least Goldfinch.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura.
9. **Serinus canarius.** Canary.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro.

¹ The generic, specific, and subspecific names here used are, with one or two exceptions, those used in the B.O.U. *List of British Birds* (1915) [when the bird occurs in both the British Isles and the Canaries], together with the amendments and corrections accepted by the Committee appointed to keep the List up to date, and published by them in the *Ibis* 1918, pp. 234-243, and 1921, pp. 310-314. The Committee have not yet completed their work.

10. **Erythropsiza githaginea amantium.** Canarian Trumpeter Bullfinch.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Fuerteventura, Lanzarote, Graciosa, Allegranza.
11. **Passer hispaniolensis hispaniolensis.** Spanish Sparrow.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Fuerteventura, Lanzarote.
12. **Petronia petronia madeirensis.** Madeiran Rock-Sparrow.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro.
13. **Montifringilla nivalis nivalis.** Snow Finch.
Status—A rare visitor. Recorded from Tenerife.
14. **Fringilla cœlebs canariensis.** Canarian Chaffinch.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Gomera.
15. **Fringilla cœlebs palmæ.** Palman Chaffinch.
Status—A resident subspecies.
Habitat in the Archipelago. Palma.
16. **Fringilla cœlebs ombriosa.** Hierran Chaffinch.
Status—A resident subspecies.
Habitat in the Archipelago. Hierro.
17. **Fringilla teydea teydea.** Teydean Blue Chaffinch.
Status—A resident species.
Habitat in the Archipelago. Tenerife.
18. **Fringilla teydea polatzeki.** Polatzek's or Gran Canarian Blue Chaffinch.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria.
19. **Acanthis cannabina meadewaldoi.** Meade-Waldo's Brown Linnet.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro.
20. **Acanthis cannabina harterti.** Hartert's Brown Linnet.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura, Lanzarote, Graciosa, Allegranza.

21. **Emberiza calandra thanneri**. Thanner's or Canarian Corn Bunting.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, and Lanzarote.
22. **Emberiza striolata sahari**. Saharan Bunting.
Status—A rare visitor. Recorded from Tenerife.
23. **Plectrophenax nivalis**. Snow Bunting.
Status—A rare visitor. Recorded from Tenerife.
24. **Alauda arvensis arvensis**. Skylark.
Status—A winter visitor, and bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
25. **Calandrella minor polatzeki**. Polatzek's Short-toed Lark.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Fuerteventura, Lanzarote.
26. **Calandrella minor rufescens**. Tenerifean Short-toed Lark.
Status—A resident subspecies.
Habitat in the Archipelago. Tenerife.
27. **Melanocorypha calandra calandra**. Calandra Lark.
Status—A rare visitor. Recorded from Tenerife.
28. **Motacilla cinerea canariensis**. Canarian Grey Wagtail.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, ? Hierro.
29. **Motacilla alba alba**. White Wagtail.
Status—A winter visitor and bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, and Fuerteventura.
30. **Budytes flava** (? **Budytes flava flava**). Blue-headed Wagtail.
Status—A rare visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
31. **Anthus bertheloti bertheloti**. Berthelot's Pipit.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Graciosa, Montaña Clara, Allegranza.

32. **Anthus trivialis trivialis.** Tree Pipit.
Status—A bird of passage through the Archipelago. Recorded from Tenerife, Fuerteventura, and Lanzarote.
33. **Anthus pratensis.** Meadow Pipit.
Status—A rare visitor. Recorded from Fuerteventura and Lanzarote.
34. **Regulus regulus teneriffæ.** Tenerifean Goldcrest.
Status—A resident subspecies.
Habitat in the Archipelago. Tenerife, Palma, Gomera, Hierro.
35. **Cyanistes cæruleus teneriffæ.** Tenerifean Blue Titmouse.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Gomera.
36. **Cyanistes cæruleus ombriosus.** Hierran Titmouse.
Status—A resident subspecies.
Habitat in the Archipelago. Hierro.
37. **Cyanistes cæruleus palmensis.** Palman Titmouse.
Status—A resident subspecies.
Habitat in the Archipelago. Palma.
38. **Cyanistes cæruleus degener.** Pale Titmouse.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura and Lanzarote.
39. **Lanius excubitor kœnigi.** Kœnig's Canarian Grey Shrike.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Fuerteventura, Lanzarote, and Graciosa.
40. **Lanius collurio collurio.** Red-backed Shrike.
Status—A rare visitor. Recorded from Tenerife.
41. **Lanius senator senator.** Woodchat.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
42. **Sylvia communis communis.** Common Whitethroat.
Status—A rare visitor. Recorded from Gran Canaria and Fuerteventura.
43. **Sylvia simplex.** Garden Warbler.
Status—An occasional visitor. Recorded from Tenerife.
44. **Sylvia atricapilla atricapilla.** European Blackcap.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, and Fuerteventura.

45. ***Sylvia atricapilla obscura***. Dusky Blackcap.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, and Hierro.
46. ***Sylvia atricapilla heineken***. Heineken's Blackcap. (An aberrant form of the Dusky Blackcap.)
Status—A resident aberrant form.
Habitat in the Archipelago. Palma.
47. ***Sylvia melanocephala leucogastra***. Canarian Black-headed or Sardinian Warbler.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, and Lanzarote.
48. ***Sylvia conspicillata bella***. Madeiran Spectacled Warbler.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, ? Hierro, Fuerteventura, Lanzarote, Graciosa, and Allegranza.
49. ***Acrocephalus arundinaceus arundinaceus***. Great Reed-Warbler.
Status—A rare visitor. Recorded once, probably from Tenerife.
50. ***Hypolais pallida elæica***. Tree Warbler.
Status—A rare visitor. Recorded from Tenerife.
51. ***Phylloscopus trochilus trochilus***. Willow Warbler.
Status—A bird of passage through the Archipelago. Recorded from Tenerife, Fuerteventura, and Lanzarote.
52. ***Phylloscopus sibilatrix sibilatrix***. Wood Warbler.
Status—An occasional visitor. Recorded from Tenerife.
53. ***Phylloscopus collybita collybita***. European Chiffchaff.
Status—A bird of passage through the Archipelago. Recorded from Fuerteventura and Lanzarote.
54. ***Phylloscopus collybita canariensis***. Canarian Chiffchaff.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, and Hierro.
55. ***Phylloscopus collybita exsul***. Lanzarotean Chiffchaff.
Status—A resident subspecies.
Habitat in the Archipelago. Lanzarote.

56. **Turdus philomelus philomelus.** Continental Song-Thrush.
 (= **Turdus musicus**, auctorum).
Status—A winter visitor to the Archipelago. Recorded from Gran Canaria, Tenerife, Gomera, Fuerteventura, and Lanzarote.
Observations—Doubtless also occurs in Palma and Hierro, although not actually recorded from these islands.
57. **Turdus musicus.** Redwing.
 (= **Turdus iliacus**, auctorum.)
Status—An occasional visitor. Recorded from Tenerife.
58. **Turdus pilaris.** Fieldfare.
Status—An occasional visitor. Recorded from Tenerife and Lanzarote.
59. **Turdus merula cabreræ.** Cabrera's Blackbird.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, and Hierro.
60. **Phoenicurus phoenicurus phoenicurus.** Redstart.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Gomera, and Fuerteventura.
61. **Phoenicurus ochrurus gibraltariensis.** Black Redstart.
Status—A bird of passage through the Archipelago. Recorded from Tenerife and Fuerteventura.
62. **Erithacus rubecula superbus.** Superb Redbreast.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria and Tenerife.
63. **Erithacus rubecula microrhynchus.** Madeiran Redbreast.
Status—A resident subspecies.
Habitat in the Archipelago. Palma, Gomera, and Hierro.
64. **Erithacus rubecula.** Redbreast.
 (? **Erithacus rubecula rubecula.**)
Status—A rare visitor. Recorded from Fuerteventura.
65. **Cyanosylvia suecica suecica.** Red-spotted Bluethroat.
Status—A rare visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
66. **Cyanosylvia suecica cyanecula.** White-spotted Bluethroat.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
67. **Saxicola dacotiae dacotiae.** Fuerteventuran Chat.
Status—A resident species.
Habitat in the Archipelago. Fuerteventura.

68. **Saxicola dacotiae murielæ**. Muriel's Chat.
Status—A resident subspecies.
Habitat in the Archipelago. Montaña Clara and Allegranza.
69. **Saxicola rubicola rubicola**. Stonechat.
Status—A bird of passage through the Archipelago. Recorded from Tenerife and the "Eastern Islands."
70. **Saxicola rubetra rubetra**. Whinchat.
Status—A bird of passage through the Archipelago. Recorded from Tenerife and the "Eastern Islands."
71. **Œnanthe œnanthe œnanthe**. Wheatear.
Status—A rare visitor. Recorded from Fuerteventura and possibly from Tenerife.
72. **Œnanthe œnanthe leucorrhoa**. Greenland Wheatear.
Status—A bird of passage through the Archipelago. Recorded from Tenerife.
73. **Œnanthe hispanica hispanica**. Western Black-eared Wheatear.
Status—A rare visitor. Recorded from Tenerife.
74. **Œnanthe deserti homochroa**. Tristram's Desert Wheatear.
Status—A rare visitor. Recorded from Tenerife.
75. **Muscicapa striata striata**. Spotted Flycatcher.
Status—A bird of passage through the Archipelago. Recorded from Tenerife and the "Eastern Islands."
76. **Muscicapa hypoleuca hypoleuca**. Pied Flycatcher.
Status—A bird of passage through the Archipelago. Recorded from Tenerife and Lanzarote.
77. **Muscicapa parva parva**. Red-breasted Flycatcher.
Status—A rare visitor. Recorded from Lanzarote.
78. **Hirundo rustica rustica**. Swallow.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Allegranza.
Observations—Probably occurs in all the islands.
79. **Delichon urbica urbica**. House-Martin.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
80. **Riparia riparia riparia**. Sand-Martin.
Status—An occasional visitor. Recorded from Tenerife, Fuerteventura, and possibly from Gran Canaria.

81. **Riparia rupestris.** Rock-Martin.
Status—An occasional visitor. Recorded from Tenerife and Fuerteventura.
82. **Dryobates major canariensis.** Tenerifean Great-Spotted Woodpecker.
Status—A resident subspecies.
Habitat in the Archipelago. Tenerife.
83. **Dryobates major thanneri.** Gran Canarian or Thanner's Great-Spotted Woodpecker.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria.
84. **Iynx torquilla torquilla.** Wryneck.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
85. **Cuculus canorus (? Cuculus canorus canorus).** Cuckoo.
Status—An occasional visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
86. **Cuculus canorus minor.** Lesser Cuckoo.
Status—An occasional visitor. Recorded from Tenerife.
87. **Clamator glandarius.** Great-Spotted Cuckoo.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
88. **Micropus murinus brehmorum.** Brehm's Pale Swift.
Status—A summer visitor.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Montaña Clara, and Allegranza.
Observations—Arrives in January; departs in September.
89. **Micropus unicolor unicolor.** Madeiran Black Swift.
Status—A summer visitor.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, and Fuerteventura.
Observations—Arrives in January; departs in October. Not yet recorded from Lanzarote or the Outer Islets.
90. **Micropus melba melba.** European Alpine Swift.
Status—A rare visitor. Recorded from Tenerife.
91. **Micropus apus apus.** Common Swift.
Status—A bird of passage through the Archipelago. Recorded from "the Canary Islands."
Observations—No particular island mentioned, but probably Eastern Group intended.

92. **Merops apiaster.** European Bee-eater.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, and Fuerteventura.
Observations—It has been known to remain to breed.
93. **Merops persicus** (? **M. p. chrysocercus**). Blue-cheeked Bee-eater.
Status—A rare visitor. Recorded from Tenerife.
94. **Upupa epops.** Hoopoe.
Status—A partial resident.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Graciosa, and Allegranza.
Observations—If two forms are recognised, they are :—
 (a) *Upupa epops epops*—A partial resident.
 (b) *Upupa epops fuerteventuræ*—A resident subspecies.
95. **Alcedo atthis** (? **Alcedo atthis pallida**). Kingfisher.
Status—A rare visitor. Recorded from Tenerife and Palma.
96. **Coracias garrulus garrulus.** Roller.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, and Fuerteventura.
97. **Tyto alba alba.** Barn Owl.
Status—A resident species.
Habitat in the Archipelago. Tenerife, and probably Gran Canaria.
98. **Tyto alba gracilirostris.** Slender-billed Barn Owl.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura, Lanzarote, and Allegranza.
99. **Strix aluco.** Tawny Owl.
Status—A rare visitor. Recorded from Tenerife.
100. **Asio otus canariensis.** Canarian Long-eared Owl.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, and Palma.
101. **Asio flammeus flammeus.** Short-eared Owl.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
102. **Neophron percnopterus percnopterus.** Egyptian Vulture.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Gomera, Fuerteventura, Lanzarote, Graciosa, Montaña Clara, and Allegranza.

103. **Circus æruginosus æruginosus.** Marsh Harrier.
Status—A rare visitor. Recorded from Tenerife.
104. **Circus pygargus.** Montagu's Harrier.
Status—A rare visitor. Recorded from Tenerife.
105. **Buteo buteo insularum.** Canarian Buzzard.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, and Allegranza.
106. **Haliaëtus albicilla.** White-tailed Sea Eagle.
Status—A rare visitor. Recorded from Gran Canaria, Tenerife, and Lanzarote.
107. **Accipiter nisus teneriffæ.** Tenerifean Sparrow-hawk.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Fuerteventura, and Lanzarote.
108. **Milvus milvus milvus.** Kite.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Gomera, and Hierro.
109. **Pernis apivorus apivorus.** Honey Buzzard.
Status—A rare visitor. Recorded from Gran Canaria and Tenerife.
110. **Falco peregrinus** (? **F. p. peregrinus** or **F. p. calidus**).
Peregrine Falcon.
Status—A rare visitor. Recorded from Fuerteventura.
111. **Falco peregrinus pelegrinoides.** Barbary Falcon.
Status—A partial resident.
Habitat in the Archipelago. Gran Canaria, Tenerife, Fuerteventura, Lanzarote, Montaña Clara, and Roque del Oeste.
112. **Falco subbuteo.** Hobby.
Status—A rare visitor. Recorded from Tenerife.
113. **Falco eleonoræ.** Eleonore Falcon.
Status—A summer visitor and bird of passage.
Habitat in the Archipelago. Fuerteventura, Lanzarote, Montaña Clara, and Roque del Este.
Observations—Arrives in mid-May; departs in mid-October.
114. **Falco vespertinus vespertinus.** Red-footed Falcon.
Status—A rare visitor. Recorded from Tenerife.

115. **Tinnunculus tinnunculus canariensis.** Canary Kestrel.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, and Hierro.
116. **Tinnunculus tinnunculus dacotiae.** Fuerteventuran Kestrel.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura, Lanzarote, Graciosa, Montaña Clara, Allegranza, and Roque del Oeste.
117. **Pandion haliaëtus haliaëtus.** Osprey.
Status—A resident species.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Graciosa, Montaña Clara, Allegranza, Lobos, and Roque del Oeste.
118. **Phalacrocorax carbo carbo.** Cormorant.
Status—A rare visitor. Recorded from Lanzarote.
119. **Sula bassana.** Gannet.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, and Fuerteventura.
120. **Anas platyrhynchos platyrhynchos.** Mallard or Wild Duck.
Status—A winter visitor and occasional bird of passage through the Archipelago in spring. Recorded from Gran Canaria and Tenerife.
121. **Marmaronetta angustirostris.** Marbled Duck.
Status—An occasional visitor. Recorded from Gran Canaria and Tenerife.
Observations—It has been known to breed in Gran Canaria.
122. **Querquedula crecca crecca.** Common Teal.
Status—A winter visitor. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
123. **Mareca penelope.** Wigeon.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
124. **Spatula clypeata.** Shoveler.
Status—A rare visitor. Recorded from Tenerife.
125. **Nyroca nyroca.** White-eyed Pochard.
Status—A rare visitor. Recorded from Gran Canaria.
126. **Nyroca ferina ferina.** Common Pochard.
Status—A rare visitor. Recorded from Tenerife.
127. **Ædemia nigra nigra.** Common Scoter.
Status—A rare visitor. Recorded from Gran Canaria.

128. **Phoenicopterus antiquorum.** Flamingo.
Status—A rare visitor. Recorded from Gran Canaria, Fuerteventura, and probably Lanzarote.
129. **Ardea cinerea.** Heron.
Status—A partial resident and bird of passage through the Archipelago.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Fuerteventura, Lanzarote, Graciosa, and Allegranza.
Observations—Not actually recorded from Hierro, but is sure to be found on the coasts of that island.
130. **Ardea purpurea purpurea.** Purple Heron.
Status—A rare visitor. Recorded from Tenerife.
131. **Egretta alba alba.** Great White Heron.
Status—A rare visitor. Recorded from Tenerife.
132. **Egretta garzetta garzetta.** Little Egret.
Status—A rare visitor. Recorded from Lanzarote.
133. **Ardeola ibis ibis.** Buff-backed Heron.
Status—A rare visitor. Recorded from Tenerife.
134. **Ardeola ralloides ralloides.** Squacco Heron.
Status—A rare visitor. Recorded from Gran Canaria and Tenerife.
135. **Ixobrychus minutus minutus.** Little Bittern.
Status—A rare visitor. Recorded from Gran Canaria, Tenerife, and Lanzarote.
136. **Nycticorax nycticorax nycticorax.** Night Heron.
Status—A rare visitor. Recorded from Tenerife.
137. **Botaurus stellaris.** Bittern.
Status—A rare visitor. Recorded from Tenerife.
138. **Botaurus lentiginosus.** American Bittern.
Status—A rare visitor. Recorded from Tenerife.
139. **Ardeirallus sturmi.** Sturni's Bittern.
Status—A rare visitor. Recorded from Tenerife.
140. **Ciconia ciconia ciconia.** White Stork.
Status—An occasional visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
141. **Platalea leucorodia.** Spoonbill.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
142. **Otis tetrax.** Little Bustard.
Status—A rare visitor. Recorded from Tenerife.

143. **Chlamydotis undulata fuertaventuræ.** Fuerteventuran Bustard.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura and Lanzarote.
144. **Œdicnemus œdicnemus insularum.** Eastern Canarian Thick-knee.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura, Lanzarote, Graciosa, and Allegranza.
145. **Œdicnemus œdicnemus distinctus.** Western Canarian Thick-knee.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Hierro; probably also in Palma and Gomera.
146. **Cursorius gallicus gallicus.** Cream-coloured Courser.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa (visitor only).
147. **Glareola pratincola pratincola.** Collared Pratincole.
Status—An occasional visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
148. **Scolopax rusticola.** Woodcock.
Status—A resident species.
Habitat in the Archipelago. Tenerife, Palma, and Gomera.
149. **Gallinago gallinago gallinago.** Common Snipe.
Status—A winter visitor and a bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
150. **Gallinago media.** Great Snipe.
Status—A rare visitor. Recorded from Tenerife.
151. **Limnocryptes gallinula.** Jack Snipe.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, and Palma.
152. **Hæmatopus meadewaldoi.** Canarian or Meade-Waldo's Black Oystercatcher.
Status—A resident subspecies.
Habitat in the Archipelago. Fuerteventura, Lanzarote, Graciosa, Montaña Clara, Allegranza, Roque del Este, and Roque del Oeste.

153. **Erolia minuta minuta.** Little Stint.
Status—An occasional visitor. Recorded from Tenerife.
154. **Erolia alpina alpina.** Dunlin.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa.
155. **Erolia ferruginea ferruginea.** Curlew Sandpiper.
Status—An occasional visitor. Recorded from Tenerife and the "Eastern Islands" (Fuerteventura and Lanzarote).
156. **Grocethia alba alba.** Sanderling.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
157. **Philomachus pugnax.** Ruff.
Status—A bird of passage through the Archipelago. Recorded from Tenerife, Fuerteventura, and Lanzarote.
158. **Tringa totanus.** Redshank.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, and Lanzarote.
159. **Tringa nebularia.** Greenshank.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, Lanzarote, and Graciosa.
160. **Tringa hypoleuca.** Common Sandpiper.
Status—A winter visitor to the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa.
Observations—A few remain in the Western Islands throughout the summer.
161. **Tringa ochropus.** Green Sandpiper.
Status—An occasional visitor. Recorded from Tenerife and Fuerteventura.
162. **Tringa glareola.** Wood Sandpiper.
Status—An occasional visitor. Recorded from Tenerife, Fuerteventura, and Lanzarote.
163. **Limosa limosa limosa.** Black-tailed Godwit.
Status—A winter visitor. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
164. **Vetola lapponica lapponica.** Bar-tailed Godwit.
Status—An occasional visitor. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.

165. **Numenius arquata arquata.** Curlew.
Status—? An occasional visitor (status not satisfactorily known).
 Recorded from Tenerife, Fuerteventura, Lanzarote, and Graciosa.
166. **Numenius phaeopus phaeopus.** Whimbrel.
Status—A winter visitor and bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa.
167. **Himantopus himantopus himantopus.** Black-winged Stilt.
Status—A rare visitor. Recorded from Gran Canaria, Fuerteventura, and Lanzarote.
168. **Recurvirostra avocetta avocetta.** Avocet.
Status—A rare visitor. Recorded from Lanzarote.
169. **Pluvialis apricarius apricarius.** Golden Plover.
Status—A rare visitor. Recorded from Tenerife.
170. **Squatarola squatarola squatarola.** Grey Plover.
Status—A winter visitor and a bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa.
171. **Charadrius hiaticula hiaticula.** Ringed Plover.
Status—A bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, and Fuerteventura.
Observations—Doubtless occurs in all the islands.
172. **Charadrius dubius curonicus.** Western Lesser Ringed Plover.
Status—A rare visitor. Recorded from Gran Canaria and Gomera.
Observations—Has been known to breed once in Gran Canaria.
173. **Leucopoliis alexandrinus alexandrinus.** Kentish Plover.
Status—A partial resident.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, and Graciosa.
174. **Eudromias morinellus.** Dotterel.
Status—A rare visitor. Recorded from Tenerife.
175. **Vanellus vanellus.** Lapwing.
Status—A winter visitor and a bird of passage through the Archipelago. Recorded from Gran Canaria, Tenerife, Fuerteventura, and Lanzarote.
176. **Pluvianus aegyptius.** Egyptian Plover.
Status—A rare visitor. Recorded from Tenerife.

177. **Arenaria interpres interpres.** Turnstone.
Status—A winter visitor and a bird of passage through the Archipelago. Some remain throughout the summer. Recorded from Gran Canaria, Tenerife, Fuerteventura, Lanzarote, and Graciosa.
Observations—Doubtless found on the coast of all the islands.
178. **Larus canus canus.** Common Gull.
Status—A rare visitor. Recorded probably from Tenerife.
179. **Larus marinus.** Great Black-backed Gull.
Status—A rare visitor. Recorded from Tenerife and Allegranza.
180. **Larus argentatus cachinnans.** Yellow-legged Herring-gull.
Status—A partial resident.
Habitat in the Archipelago. The coasts of all the islands, principally breeding on Roque del Este (Eastern Group) and Anaga Rocks (off Tenerife).
181. **Larus fuscus fuscus.** Continental Lesser Black-backed Gull.
Status—A rare visitor. Recorded from Tenerife.
182. **Larus fuscus affinis.** British Lesser Black-backed Gull.
Status—A winter visitor. Recorded from Gran Canaria, Tenerife, Lanzarote, and at sea between Cape Juby and Canaries.
183. **Larus ridibundus.** Black-headed Gull.
Status—An occasional visitor. Recorded from Gran Canaria and Lanzarote.
184. **Rissa tridactyla tridactyla.** Kittiwake.
Status—An occasional visitor. Recorded from Tenerife, Palma, Lanzarote, and "off Gran Canaria within sight of land."
185. **Sterna hirundo.** Common Tern.
Status—A summer visitor. Recorded from Gran Canaria (bred formerly); Tenerife (? breeding); also Fuerteventura and Lanzarote (bred formerly).
186. **Sterna minuta minuta.** Little Tern.
Status—An occasional visitor. Recorded from Tenerife and the "Eastern Islands."
187. **Sterna sandvicensis sandvicensis.** Sandwich Tern.
Status—An occasional visitor. Recorded from Gran Canaria, Fuerteventura, and Lanzarote.
188. **Alca torda.** Razorbill.
Status—A rare visitor. Recorded from the shores of Gran Canaria and Tenerife, and off the "Eastern Islands."

189. **Uria troille troille.** Common Guillemot.
Status—A rare visitor. Recorded from Gran Canaria.
190. **Fratercula arctica arctica.** Puffin.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
191. **Thalassidroma pelagica.** Storm Petrel.
Status—An annual visitor. Recorded from the Canarian Seas off Tenerife. Once taken on land on Montaña Clara.
Observations—Not known to breed for certain.
192. **Oceanodroma leucorhoa leucorhoa.** Leach's Fork-tailed Petrel.
Status—An annual visitor. Recorded from the Canarian Seas off Gran Canaria and Tenerife.
Observations—Erroneously recorded as breeding on Montaña Clara.
193. **Oceanodroma castro castro.** Madeiran Fork-tailed Petrel.
Status—A rare visitor. Recorded from the Canarian Seas off Gran Canaria.
194. **Oceanites oceanicus oceanicus.** Wilson's Petrel.
Status—An annual visitor. Recorded from the Canarian Seas off Tenerife.
195. **Pelagodroma marina hypoleuca.** North-Atlantic Frigate-Petrel.
Status—An annual visitor. Recorded from the Canarian Seas off Tenerife.
196. **Puffinus puffinus puffinus.** Manx Shearwater.
Status—An annual visitor. Recorded from the Canarian Seas off Tenerife, Palma, and Gomera, and formerly Allegranza.
Observations—Erroneously reported to breed on Allegranza.
197. **Puffinus assimilis baroli.** Madeiran Allied Shearwater.
Status—A summer visitor. Recorded breeding on Gran Canaria, Tenerife, Montaña Clara, and probably Graciosa.
198. **Calonectris kuhli fortunatus.** Canarian Kuhl's Shearwater.
Status—A summer visitor.
Habitat in the Archipelago. The seas of all the islands. Recorded breeding on Gran Canaria, Tenerife (probably also on Palma, Gomera, and Hierro), Fuerteventura, Lanzarote, Lobos, Graciosa, Montaña Clara, Roque del Oeste, and Roque del Este.

199. **Bulweria bulweri bulweri.** Bulwer's Petrel.
Status—A summer visitor. Recorded breeding on Tenerife and Montaña Clara.
Observations—Said to have bred on Allegranza; apparently ceased to do so now.
200. **Podiceps nigricollis nigricollis.** Black-necked Grebe.
Status—A rare visitor. Recorded from Lanzarote.
201. **Podiceps ruficollis.** Little Grebe.
Status—A rare visitor. Recorded from Lanzarote.
202. **Porzana porzana porzana.** Spotted Crake.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
203. **Porzana pusilla intermedia.** Baillon's Crake.
Status—An occasional visitor. Recorded from Tenerife.
204. **Porzana parva.** Little Crake.
Status—A rare visitor. Recorded from Tenerife and Lanzarote.
205. **Crex crex.** Land-Rail.
Status—An occasional visitor. Recorded from Tenerife and Lanzarote.
206. **Gallinula chloropus.** Water-hen.
Status—An occasional visitor. Recorded from Gran Canaria (breeding), Tenerife, and Fuerteventura.
207. **Fulica atra atra.** Coot.
Status—A winter visitor. Recorded from Gran Canaria, Tenerife, Hierro, Fuerteventura, and Lanzarote.
208. **Columba junoniæ.** Canarian Laurel Pigeon.
Status—A resident species.
Habitat in the Archipelago. Palma and Gomera.
209. **Columba bollei.** Belle's Pigeon.
Status—A resident species.
Habitat in the Archipelago. Tenerife, Palma, and Gomera. (Formerly also in Gran Canaria, now extinct.)
210. **Columba livia canariensis.** Canarian Rock Pigeon.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, Lanzarote, Lobos, Graciosa, Montaña Clara, and Allegranza.

211. **Streptopelia turtur turtur.** Turtle Dove.
Status—A summer visitor.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, Gomera, Hierro, Fuerteventura, and Lanzarote.
212. **Streptopelia turtur arenicola.** North African Turtle Dove.
Status—A rare visitor. Recorded from Gran Canaria.
213. **Pterocles orientalis.** Black-breasted Sand-grouse.
Status—A resident species.
Habitat in the Archipelago. Fuerteventura. Recorded as rare visitor in Gran Canaria.
214. **Alectoris rufa australis.** Gran Canarian Red-legged Partridge.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria.
215. **Alectoris barbara koenigi.** Koenig's Barbary Partridge.
Status—A resident subspecies.
Habitat in the Archipelago. Tenerife, Gomera, and Lanzarote.
216. **Coturnix coturnix coturnix.** Migratory Quail.
Status—A summer visitor and bird of passage through the Archipelago.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, ? Gomera, ? Hierro, Fuerteventura, and Lanzarote.
Observations—Probably passes through all islands on migration. Summer visitors arrive in January and February and depart in the autumn (date uncertain).
217. **Coturnix coturnix confisa.** Madeiran Quail.
Status—A resident subspecies.
Habitat in the Archipelago. Gran Canaria, Tenerife, Palma, ? Gomera, ? Hierro. (Eastern Group: doubtful if occurs.)
Observations—Considerable confusion has taken place between this and the above-mentioned Quail. The status of each is not definitely known.

DOUBTFUL OCCURRENCES.¹

(Including all birds that have been recorded on evidence which requires further proof, before the species can be admitted to the list of authentic occurrences).²

Emberiza cia. Meadow-Bunting.

Recorded from Gran Canaria.

Anthus campestris. Tawny Pipit.

Recorded from Fuerteventura.

Regulus ignicapillus madeirensis. Madeiran Fire-crest.

Recorded from Tenerife.

Malaconotus poliocephalus. West African Grey-headed Bush-Shrike.

Recorded from Tenerife.

Melizophilus undatus. Dartford Warbler.

Recorded from Tenerife.

Acrocephalus aquaticus. Aquatic Warbler.

Recorded from Gran Canaria and Fuerteventura.

Cenanthe isabellina. Isabelline Wheatear.

Recorded from Canary Islands (? Tenerife).

? **Dryobates minor.** Lesser Spotted Woodpecker.

Recorded from Gomera.

Caprimulgus europæus. Nightjar.

Recorded from Tenerife and Fuerteventura.

Caprimulgus ruficollis. Red-necked Nightjar.

Recorded from Tenerife.

Merops lamark viridissimus. African Green Bee-eater.

Recorded from "Canary Islands."

Halcyon leucocephala. White-headed Kingfisher.

Recorded from Tenerife.

Otus scops scops. Scops' Owl.

Recorded from Lanzarote and Fuerteventura. Said to breed.

¹ The birds contained in this list are fully discussed by me in the *Ibis*, April 1920. Appendix A, pp. 323-340.

² In addition to these there are a number of species recorded from the Canaries obviously in error. These are not included here, but are dealt with at length in the *Ibis*, April 1920. Appendix B, pp. 341-360.

Carine noctua. Little Owl.

Recorded from Tenerife.

Hieraëtus fasciatus. Bonelli's Eagle.

Recorded from Tenerife.

Milvus migrans. Black Kite.

Recorded from "Canary Islands."

Anser anser. Gray-Lag Goose.

Recorded from Tenerife.

Querquedula querquedula. Garganey.

Recorded from "the Archipelago."

Megalornis grus grus. Common Crane.

Recorded from the Eastern Islands.

Ardenna gravis. Greater Shearwater.

Recorded from the Canarian Seas.

Fulica cristata. African Crested Coot.

Recorded from "the Canaries."

Porphyrio caeruleus. Purple Gallinule.

Recorded from Tenerife.

Columba palumbus. Wood-Pigeon.

Recorded from Tenerife.

Columba trocaz. Madeiran Pigeon.

Recorded from "the Canaries."

Streptopelia senegalensis. Senegal Turtle Dove.

Recorded from Fuerteventura.

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